

BULLETIN OF MISCELLANEOUS INFORMATION Appendix I 1932 ROYAL BOTANIC GARDENS, KEW

REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1931.

General.

STAFF.—The year 1931 has been a particularly sad one for Kew owing to the lamented death on June 28th of Major Thomas Ford Chipp, M.C., D.Sc., Assistant Director since August 1st, 1922, (*K.B.* 1931, pp. 397, 433).

Mr. J. S. L. Gilmour was appointed to fill the vacant post of Assistant Director (*K.B.* 1931, p. 459), and took up his duties on October 21st.

Mr. R. A. Dyer has been appointed Assistant for South Africa in the Herbarium by the Government of the Union of South Africa, in succession to Mr. C. A. Smith.

Mr. G. W. Robinson was appointed Assistant Curator in charge of the Herbaceous and Rock Garden Department (*K.B.* 1931, p. 105), to fill the vacancy caused by the resignation of Mr. A. E. Edwards.

We record with pleasure the award of the V.M.H. to Mr. W. Dallimore and of the Associateship of Honour to Mr. T. W. Taylor by the Council of the Royal Horticultural Society.

INTERCHANGE OF OFFICERS.—The very valuable interchange arrangement between Kew and the Queensland Department of Agriculture terminated early in the year and Mr. W. D. Francis and Mr. C. E. Hubbard resumed their duties in their respective institutions in the spring.

OFFICIAL VISITS.—THE DIRECTOR, as recorded in last year's Review, was in South and East Africa during the winter months of 1930-31. Thanks to the kindness of the Government of the Union of South Africa and to the admirable arrangements made by Dr. I. B. Pole Evans, C.M.G., for a comprehensive tour in the Cape Province, Natal, the Free State and the Transvaal, and to Professor R. H. Compton for his hospitality at Kirstenbosch and for arranging the programme for the time spent around Cape Town, a most interesting tour was made and a report* has been sent to the Prime Minister of the Union. An extensive tour was made in the Cape Province,

* Extracts from this report have been published in the *Journal of the Botanical Society of South Africa*, part xvii, p. 6, 1931.

including a stay at Kirstenbosch and Whitehill, and visits were paid to the Bolus, South African and Marloth Herbaria ; Table Mountain was explored with Dr. Marloth, and Stellenbosch University, the Rhodes Farms and other centres of agricultural and botanical interest near Cape Town were visited.

Travelling by car by way of Mossel Bay, George, Knysna and the Zitzikama Forest to Port Elizabeth, in the company of Mr. F. S. Laughton, Forest Officer, many historic plant localities were examined and collections of seed for Kew were made. From Port Elizabeth onwards, when Mr. R. A. Dyer was in charge of the arrangements, fine groves of *Encephalartos* were visited and also the Sunday's River plantations. A visit was paid to Grahamstown and to the Fauresmith Experiment Station near Bloemfontein with Dr. Pole Evans, and the very interesting research work that is being carried on there by Dr. Henrici in connection with over-grazing problems was carefully studied. Visits were paid to the Gardens and Experimental Plantations in Natal, in and around Pietermaritzburg and Durban and some time was spent in examining the research work of the University Colleges and of the Union Agricultural Department at Durban. Opportunities were afforded, thanks to Professor Bews, Mr. McClean, Colonel Molyneux and many others, of seeing many interesting features of the native vegetation near Durban and collections of seeds were made for Kew.

The visit to the Union concluded with a stay of some days at Pretoria. During this time the very interesting and important series of varieties and species of the Woolly-finger Grass (*Digitaria*) and other experiments with grazing plants at Prinshof were carefully studied under the guidance of Dr. Pole Evans. The Herbarium and Research Department of the Department of Agriculture were fully inspected and visits were paid to Onderstepoort with Dr. du Toit, and to other institutions in and around Pretoria and Johannesburg. The Gardens around the Union Buildings with their collection of Aloes, Cycads, etc., were also examined and a visit was paid to Fountains, a very beautiful park, where it is hoped to establish a Botanic Garden for Pretoria in which a representative display of plants native to the Transvaal could be assembled, together with a collection of allied exotic plants.

Proceeding to Southern Rhodesia, the Director visited the Rhodesian Museum with Dr. Arnold and saw the small historic Herbarium collection ; the Matopo Agricultural School with Dr. Haylett, the Principal, and the Matopos Park under the able guidance of Mr. Bertram Woods, the Curator. Many interesting plants were in flower and some collections were made. It was obvious that the whole Matopos area is worthy of a careful Botanical Survey.

A visit was paid to the Victoria Falls where the Director was kindly met by Mr. Pardy, Forest Officer, whose knowledge of the botany of the district added greatly to the value of his visit. Some

collections of dried specimens and seeds were made ; Efwatakala grass (*Melinis*), was noticed in the vicinity of the Falls and Aloes, Sansevierias, Stapelias and Ceropegias were noticed growing either on the vertical rocks of the Fall itself or in the shade of bushes in the damp soil of Cataract Island at the edge of the Falls.

On the journey to Beira a stay was made at Salisbury, where the Director was the guest of His Excellency the Governor, and full opportunity was afforded him of inspecting the many valuable activities of the Agricultural Department. It was especially gratifying to note the growth of the Botanical Department and the Herbarium, and to see the useful work being done at the Experimental Station with pasture grasses and fodder crops. From Beira the Director took ship to Zanzibar and thence to Mombasa. At Zanzibar he was met by Mr. Kirkham, then Director of Agriculture, and was most kindly entertained by His Excellency the Resident during his stay in the Island. Thanks to the kindness of Mr. Kirkham, the Director was able to visit several Clove plantations and Coconut groves and to see the other activities of the Agricultural Department. He also had the honour of an interview with H.H. the Sultan and visited the Shamba da Balotzi, Mbweni, the historic old home and garden of Sir John Kirk when he was Consul-General.

In Kenya the Director was the guest of Dr. and Lady Muriel Jex-Blake. He was conducted over the Scott Laboratories and the grounds of the Agricultural Department by Mr. Alex Holm and members of his staff, and saw all the various activities of the Department, in particular the valuable wheat-breeding work which is being carried on and the many difficult problems which have arisen in connection with rusts and rust-resistance. The work of the Forestry Department was studied under the guidance of Mr. H. M. Gardner, Conservator of Forests, and with him an excursion was made to the Juniper and Podocarpus forests on the slopes of Mount Kenya ; here some living plants and seeds were collected for Kew. The interesting Arboretum and Forestry Herbarium at Nairobi were carefully studied, and a visit was paid to the Coryndon Museum where the admirable collections were examined with great interest. The Herbarium, under the charge of Miss Napier, and the botanical work in progress at the Museum should prove of great value to the Colony.

Uganda was reached on January 12th and the Director was then joined by Mr. Stockdale, Agricultural Adviser, Colonial Office. During their stay at Entebbe they were the guests of His Excellency the Governor. They were present at the opening of the Jinja Bridge over the Nile close to the Ripon Falls by His Excellency on January 14th, 1931, and travelled in the first train to cross the Bridge, His Excellency driving the engine.

The Director and Mr. Stockdale were then taken by Mr. Tothill, Director of Agriculture, for an extensive tour of some days through Bugishu, Teso, Lango, Bunyoro and the Buganda Territory. The

Agricultural Stations were carefully inspected at Bukalasa, Bugusege, Budadiri—at the foot of Mt. Elgon—Serere, Arungo, Lira, Ngetta, Massindi—where the new Tobacco drying sheds were inspected—Mr. Stafford's Coffee and Rubber plantations near Hoima and various native Coffee shambas. At the Experiment Stations particular attention was paid to the important work being done on Cotton, Coffee, Cassava, Sugar Cane, and Bananas. The tour covered some 1000 miles in Uganda and collections of living and dried plants and seeds were made and brought back to Kew. The Laboratories, Herbarium and Experiment Grounds at Kampala were examined, and a visit was paid to Makerere College, which is doing very valuable educational work in the Protectorate; the agricultural educational work was also inspected. While at Entebbe, the Director paid several visits to the Botanic Garden, which is beautifully situated on the Lake shore and planted with a very interesting collection of native trees, ferns and shrubs. He was able to put forward some suggestions for its further development and improvement, which it is hoped may be carried out.

After a further short stay at Nairobi, the Director with Mr. Stockdale, Mr. Tothill and Mr. Holm proceeded, by way of Voi and Moshi—where a large Coffee Estate was visited on the slopes of Mt. Kilimanjaro—to the Amani Research Station, Tanganyika Territory. Here, at the request of the Secretary of State, he attended the Conference of East African Directors of Agriculture. This occupied the first week in February, and the Report of the Conference has now been published. Ample opportunities were afforded of seeing the work in progress in the Herbarium and Library, both of which were in excellent order, the Pathological, Chemical, Physiological and Genetical Departments. In all the Departments important long range research was in progress and some valuable results were being obtained, especially with regard to the yellows-disease of Tea and shade problems relating to Coffee. The plantations, the very useful vegetable garden and the nurseries were carefully studied and the important work in progress on Sisal, Cinchona and other economic crops was examined.

During the visit to Amani, something was seen of the beautiful country around the Station and its interesting flora, and excursions were made with the Botanist and other members of the staff. To the Director and staff of the Research Station the Director is deeply grateful for all their help and kindness during his memorable stay at Amani. He was particularly impressed with the work which had been done by the Superintendent of Plantations, who, in addition to his horticultural work, had been responsible for the construction of the road from Sigi to Amani, and many other constructional works at the Station.

The Director left Tanga on February 10th, and after a three days' stop at Kilindini (Mombasa), during which a visit was paid to Kalifi

and Gede, Kew was reached via Marseilles and Calais on the evening of March 7th.

THE DIRECTOR also attended the celebration of the Bicentenary of the foundation of the Royal Dublin Society on June 25th and presented an address (*K.B.* 1931, p. 461).

In response to a request to obtain for Kew propagating material of the Cavendish Banana from the Canary Islands, Mr. J. Wardle of Messrs. Yeoward Brothers very generously provided Mr. H. C. SAMPSON, Economic Botanist, with a return passage on one of their ships to Teneriffe and Grand Canary and further rendered him all possible help in selecting the planting material which was required and in studying the cultivation of Bananas in those islands. Mr. Sampson also had an opportunity of seeing something of the Tomato industry in Grand Canary.

The planting material thus obtained is being propagated in the banana quarantine house at Kew. Suckers from this material are being despatched to the Imperial College of Tropical Agriculture, Trinidad, as they become available.

In connection with Resolution No. 7 of the Fifth International Botanical Congress the KEEPER OF THE HERBARIUM paid a visit to Berlin in August. An informal meeting was held at Dahlem and methods of dealing with urgent taxonomic needs and of obtaining the necessary financial assistance were discussed. Advantage of the opportunity was taken to compare a number of specimens in the Herbarium and to discuss various problems with members of the staff. A brief call was also paid to the Jardin Botanique de L'Etat at Brussels for the same purpose, and the return journey was made via Copenhagen and Lund in order to consult the Agardh Herbarium on matters concerning marine algae.

MISS M. L. GREEN, Assistant for the Index Kewensis, paid a short visit to Sweden during June, in order to make a search in certain libraries for periodicals and separate works containing names and descriptions of new genera and species not accessible in this country. The Institutions concerned were the Bergianska Trädgården, Riksmuseum, Academy of Sciences at Stockholm and the Library of the University and the Botanic Garden at Uppsala. As a result of this visit many additional names were obtained for the Index Kewensis and several valuable gifts were received for Kew (*see pp.* 40 and 51).

MR. N. Y. SANDWICH paid two short visits to the Muséum d'Histoire naturelle at Paris in order to study type specimens of Guiana species in connection with his studies on the Flora of British Guiana.

MR. C. E. HUBBARD returned to duty at Kew on June 5th after the completion of his year's stay in Queensland, where he had been

attached to the Department of Agriculture and Stock, in exchange with Mr. W. D. Francis (*see K.B. Appendix I, 1931, pp. 1 and 2*).

He arrived in Brisbane on April 3rd, 1930. During the first nine months he was engaged in revising and classifying the large collection of grasses in the Queensland Herbarium. Throughout this period Mr. C. T. White, the Government Botanist, very kindly arranged numerous collecting trips to all parts of the Moreton District. Several visits were made to the Glass House Mountains, where many rare plants were obtained. The Queensland Field Naturalists Club kindly permitted him to join several of their excursions, the most important being to Stradbroke Island in Moreton Bay. Other places visited were the Macpherson Range, Main Range near Toowoomba, Mistake Range, Tambourine Mountain, Albert River and Bribie Island.

A week was spent on Fraser Island with the Australasian Ornithological Union; here over 250 different species were collected. Mr. Hubbard was enabled to join a surveyor's camp for a few days in the country near Miles, in the western part of Darling Downs District, which was badly infested with "Prickly Pear" (*Opuntia* spp.). Many of the more interesting plants collected on this trip were obtained from the Dividing Range, between Wandoan and Miles.

On the approach of summer, Mr. C. T. White was able to arrange extensive expeditions into the main grassland belts of Queensland. Mr. Hubbard was fortunate in being often accompanied by Mr. C. Winders, of Brisbane University, who rendered very great assistance in drying the plants collected. Early in January they left Brisbane for Mungallala, Charleville and Cunnamulla. Important collections were made and several species not previously recorded for Queensland were gathered. The return journey was broken at Mitchell, Amby, Miles, Chinchilla and Macalister. Unfortunately, owing to lack of rain, many areas were in too poor a condition to be visited. The main collecting expedition to Northern and Central Queensland occupied nearly two months. The most important areas investigated were Sarina, Bowen, Townsville, Charters Towers, Torrens Creek, Prairie, Hughenden, Nonda, Cloncurry, Duchess, Mount Isa, Cairns and Chillagoe. At the last place many of the species collected by Dr. Domin in 1910 were found, and nearly 60 different grasses were gathered. Whilst at Hughenden they were taken through the basalt country to Chudleigh Park, where the grasslands were in excellent condition. The return journey to Brisbane was made via Winton and Longreach, through the Mitchell-grass country. In Central Queensland collections were made at Jericho, Alpha, Emerald and Rockhampton. The third and last expedition was made to Dirranbandi, the granite belt around Stanthorpe and to various localities in the Darling Downs. During these trips over 75 per cent. of the known species of Queensland grasses were collected and several new species discovered.

Throughout his stay in Queensland Mr. Hubbard received valuable aid from officers of the Agricultural Department, the State Railways and many others.

On the return journey home visits were paid to the Herbaria at Sydney, Melbourne, Adelaide and Perth. Whilst in New South Wales a large collection of grasses was made at Glen Innis and between Sydney and the Blue Mountains. The Directors and Staff of the Botanic Gardens and Herbaria, as well as other botanists, rendered valuable help in each centre.

Through the courtesy of the Commonwealth Railway officials, the journey on the Trans-Australian Railway across the Nullarbor Plain was broken at Barton, Hughes and Forrest, where many rare plants were obtained.

THE KEEPER OF THE MUSEUMS attended the Annual General Meeting of the Royal English Forestry Society at Shrewsbury from August 29th to September 3rd.

MR. J. H. HOLLAND attended the Conference of the Museums Association at Plymouth from July 6th to 11th.

The following two expeditions were rendered possible thanks to the grant received from the Empire Marketing Board for overseas missions and collecting purposes.

During 1931 MR. J. H. L. WATERHOUSE continued to collect in the Solomon Islands group and worked entirely on the Island of Bougainville. With the very damp atmospheric conditions drying was carried out under great difficulty, but notwithstanding this Mr. Waterhouse was able to send home numerous parcels of specimens amounting in all to 550 numbers (with several sets of duplicates). The material was well prepared and arrived in better condition than any previous instalments received from the Solomon Islands. Mr. Waterhouse was also able to obtain seed of Banana varieties and material of other economic plants for Professor Cheesman at Trinidad.

MR. B. D. BURTT paid a visit of two months duration in December 1930, and January 1931, to the Virunga Range of mountains on the frontier of the Belgian Congo and the Belgian Mandated area of former German East Africa. Though visited by several scientific expeditions, the area had been little explored botanically, with the exception of one German expedition 23 years ago. He was successful in collecting on all the eight mountains of the range and reaching the summit of all except Mt. Mikeno, a feat which, it is understood, no previous explorer had succeeded in accomplishing. Rain and driving clouds somewhat hindered collecting, but he brought home a collection of 490 numbers (with several sets of duplicates). Collections were also made between Lake Bunyoni and the eastern wall of the Rift Valley, and on the recent lava fields of the 1905 outbreak of Mt. Namlagira. As is the case in other volcanic areas, the flora was

not rich in species and few novelties were found. The collection, however, is an exceedingly interesting and valuable one from the general scientific point of view.

TUNG OIL (*Aleurites Fordii*).—Two years ago a grant was made by the Empire Marketing Board for the investigation of this tree. Interest is being maintained in its cultivation and information is being accumulated regarding its behaviour in different parts of the Empire. In very few countries, however, have the trees yet developed sufficiently to form fruit and it will be some time before this information will be sufficiently complete to be of value. In the drier parts of Assam it is reported that trees of this species have made remarkable growth and are already beginning to fruit. The tree shows much variation both in its branching habit and in the flowering habit. It is monoecious and normally appears to form only one female flower at the apex of an inflorescence of otherwise male flowers, but in the case of some trees, female flowers are formed at the apex of several of the branches of the inflorescence. Knowledge on these and similar points, which is being collected, may have an important bearing on the development of this industry.

The sale-distribution of seed, which in the past has been effected from Kew, has now been discontinued. Technical officers in different parts of the Empire, who have taken a prominent part in co-operating with Kew in seed distribution and in arranging for trials of this tree, have, however, been informed of reliable sources from which seed can be obtained, so that local arrangements can be made to procure further supplies of seed should they be required.

Aleurites montana. A further consignment of this seed has been obtained from China and has been distributed to several parts of the Empire, more especially to those parts where conditions appear to be too tropical for the successful cultivation of *A. Fordii*. Though the seed received had already commenced to germinate by the time it reached Kew, by careful attention to packing and by making special arrangements with shipping companies for its transit, it has been possible to get this species established in several of the places to which seed was sent. The condition of the seed was such, however, that it was considered inadvisable to send any to places where the seed would be a long time in transit, and it is hoped that further supplies, which are now on order, will arrive in suitable condition to supply these areas.

BANANA RESEARCH.—Kew has been able to render further assistance to Professor Cheesman in connection with his Banana breeding work which he is conducting at the Imperial College of Tropical Agriculture at Trinidad and requests for seed of seeding species of *Musa*, many of which have since been complied with, have been sent to British North Borneo, Sarawak, Malaya, Samoa, Seychelles, New Guinea, Queensland and India. Mons. A. Chevalier has kindly promised to endeavour to obtain seed from the French W.

Pacific Islands and Mr. Waterhouse has succeeded in obtaining seed of more than one species in the British Solomon Islands.

The Banana quarantine house, since it has been altered and reconditioned, has been freshly stocked. Much of this consists of material representing the forms of *M. Cavendishii*, obtained from the East as well as from countries where this has been imported and is being now cultivated. Material has been obtained from the Canaries, through the good offices of Messrs. Yeoward Bros. and Messrs. Elder and Fyffe, from Brazil through the British Banana Company, as well as from Burma through the Director of Agriculture. Unfortunately material obtained from the Department of Agriculture, Malaya, did not survive the journey and further supplies are being obtained. Suckers have already been propagated from the Canary Island consignments and have been despatched to Prof. Cheesman at Trinidad.

OTHER ACTIVITIES.—The Director was elected President of the School Nature Study Union for the year.

DIRECTOR'S OFFICE.—During the autumn the Director's Office has been enlarged and the work is now nearing completion. Two new rooms have been added, the front door has been moved from the west to the south side and suitable accommodation for visitors, filing of documents, and for the clerical Staff has now been provided.

The fine old Wistaria was carefully detached from the building and fixed to poles before operations commenced and has now been replaced unharmed on the new portion of the building.

As in the case of the other new buildings (*see* pp. 12 and 28) the plans were designed by Mr. J. H. Markham, H.M. Office of Works.

PUBLICATIONS.—During the year ten numbers and only two, instead of the usual three, Appendices of the *Kew Bulletin* were published. This was due to the decision to discontinue the publication of the "List of Staffs" (Appendix II), owing to the recent appearance of similar lists covering the same ground (*K.B.* 1931, p. 502).

The new edition of the Handlist of Tender Dicotyledons and Gnetaceae appeared in June (*K.B.* 1931, pp. 417-20).

A new edition of the Popular Official Guide was also published.

The first part of vol. II of the Flora of West Tropical Africa (part III of the complete work), was published in March. It contains all the Gamopetalae, nearly half of which are represented by Rubiaceae and Compositae. The families had not been revised as a whole since 1877.

A paper on the Herbal of Leonhart Fuchs (*Journ. Linn. Soc. Bot.* xlviii, pp. 545-642: 1931) was published in October.

The International Address Book of Botanists, the compilation of which was undertaken by an international committee with Major Chipp as British member, was published in December (*K.B.* 1931,

p. 502). A large part of the actual work of publication was carried out by Major Chipp before his death and was subsequently finished by Miss Verbrugge under the supervision of the Director.

The Gardens.

VISITORS.—The number of visitors to the Gardens in 1931 was 1,389,184, a decrease of 155,028 compared with the figures for 1930.

The falling off was most marked in the week-end attendances, particularly Sundays, for which the total figures were 109,129 less than those in the previous year. This is not surprising and is due to the monotonous sequence of wet week-ends during the earlier months of the year.

The greatest monthly attendance was in May with 345,525, the lowest in December with 10,449. The highest daily attendance was 96,859 on Whit-Monday, May 25th; this figure exceeded the previous record (Whit-Monday, June 9th, 1930) by 4,355. The lowest attendance was 7 on January 23rd.

On Monday, October 5th, 1931, the admission charge of one penny, abolished on August 5th, 1929, was reimposed with the concession of free admission (excepting perambulators) on Bank Holidays, and the waiving of charges for school parties on the penny days. The charge of sixpence on Students' Days (Tuesdays and Fridays) remains unchanged.

PLANT HOUSES, EXTENSIONS AND ALTERATIONS.—In the Annual Review for 1929 (Appx. I, 1930, p. 15), the generous gift by Mrs. Sherman Hoyt of the Collection of Cacti which she exhibited at the Chelsea Show is recorded (*see also K.B.* 1929, p. 239). In order that this collection, together with the large scenic picture of the Mohave desert which she also presented, and which formed the striking background of her Chelsea exhibit, might be fittingly displayed at Kew, Mrs. Sherman Hoyt has most generously provided the funds for the erection of a new Cactus House. The building, designed by Mr. J. H. Markham, H.M. Office of Works, was completed towards the close of the year and has been built at right angles to the T range, at the North end. The House, which will be called "The Sherman Hoyt Cactus House," bears the following inscription on a lead plaque. "This House together with the Scenic Background and many of the Plants was presented to the Royal Botanic Gardens, Kew, by Mrs. Sherman Hoyt of Pasadena, California. House erected 1931." It faces due South and consists of a central apse with a high North wall and two wings. The picture has been mounted on the wall of the apsidal central portion and the foreground will be built up of old red sandstone rock from Dunster, Somerset, which closely resembles the red rock depicted in the scenic background. The apse is roofed with ground glass to prevent the shadows of the woodwork falling on the painting in bright sunlight. Recently, through the continued kindness of Mrs. Hoyt, two large specimens of *Carnegiea*

gigantea (*Cereus giganteus*), 5½ ft. and 10 ft. in height respectively, have arrived, and will occupy prominent positions in this house.

In order to be able to grow consignments of Bananas and other plants received from different places overseas for transmission to the Colonies and insure that they are free from insect or fungus pests, the Banana house has been divided into three independent compartments and the ventilators have been screened with fine gauze. Three quarantine frames have also been fitted up, where consignments of new plants can be placed on arrival and inspected before they are put out in the Quarantine House, and thus reduce to a minimum the risk of infection through fresh importations of dangerous pests.

The central portion of the interior of the Palm House was repainted. Painting has been done to the outside of the Succulent House (no. 5) also houses no. 6 and 6a, the interior iron work being scraped, repainted and repaired where necessary.

In the "Melon Yard" the hot water pipes in several of the smaller houses have been overhauled and rearranged in the hope that a more efficient and regular service may be obtained.

A new sectional boiler has been installed in the T range stoke-hole, taking the place of two old saddle boilers. The installation of new sectional boilers in the Palm House stokehole during 1930 has resulted in a great improvement, the temperature of the house being more easily and regularly maintained.

ROCK GARDEN.—The portion recently extended now presents a well furnished appearance. The old bog, near the south end of the original section, has been cleaned out, the soil being replaced with fresh compost; advantage has been taken at the same time to effect some improvement in the surrounding rock-work.

Some further alterations have been made to the beds in the Iris Garden, the bulk of the collection now being arranged in a more or less definite colour scheme, which should add greatly to the general effect when the plants are in flower. A red-flowered Horse Chestnut tree has been removed from the east end of the garden; the beds in the immediate vicinity will thus gain more light, air and sun.

A considerable number of new and interesting plants flowered in the Rock Garden and Alpine House during the past year, the most interesting being *Primula sonchifolia*, which was specially collected on Hpimaw and sent home frozen solid in bamboo pots. Kew is indebted to Mr. T. Hay, M.V.O., V.M.H., Superintendent of Hyde Park, for this rare *Primula* and for a share of a large consignment of seeds presented by the Maharaja of Nepal to H.M. the King, amongst which may be mentioned *Meconopsis regia*, *M. auriculata*, *M. nepalensis* and *M. paniculata*, also for such rare *Primulas* as *P. Wollastonii*, *P. didyma*, *P. cardiophylla* and *P. muliensis*.

Among the large number of *Gentians* which flowered in 1931 were *G. ornata*, *G. rigescens*, *G. Macauleyi* and *G. hexa-Farreri*. Other

plants worthy of notice which bore flowers were *Ranunculus Lyallii*, *Primula Reinii*, *Cypridedium cordigerum*, *Swertia cordata*, *S. punicea*, *Codonopsis khasiana* and *C. tubulosa*.

TEMPERATE HOUSE.—The replanting which was carried out during the spring of 1930 in the south wing has proved a great success, the bulk of the plants having made good growth. This should give an increased display of flowers in the future.

The large and comprehensive collection of tender conifers, built up gradually over a long term of years, was exhibited at the Conifer Conference held in the Royal Horticultural Society's Hall in October, 1931. The collection now forms a permanent feature in the North Octagon, the large orange trees having been moved to the South Octagon, where under somewhat warmer conditions it is hoped they may improve in health. The Rhododendrons in the new annexe have made good progress: many of them flowered during the past season, including the following:—*Rhododendron Scottianum*, *R. Jenestierianum*, *R. laxiflorum*, *R. sino-Nuttallii*, *R. leucaspis*, *R. eriogynum*, *R. stamineum* and *R. supranubium*.

ARBORETUM.—The wet and sunless conditions which prevailed during the greater portion of the year entailed much extra labour in lawn mowing and grass cutting. This, however, was counter-balanced by the fact that little or no watering was necessary.

A portion of the conifer collection has been replanted, greater space being given to individual plants, whilst at the same time they were cleared thoroughly of dead wood.

Meliosma Veitchiorum, native of W. China, flowered for the first time at Kew.

FLOWER GARDEN. On each flank of the steps on the north west side of the pond, a portion of the banks has been cleared of overgrown bushes, the cleared spaces being turfed almost to the water's edge.

Viewed from the opposite side of the pond, the alterations have a more pleasing effect than formerly, as the newly turfed portion appears to merge into the lawns beyond. The margin has been planted with Siberian Iris.

The extensions to the Director's office, now proceeding, have necessitated a considerable amount of ground work in the matter of alterations to the line of the old, and the construction of new, paths. It has also involved altering, re-making and planting new beds and borders.

The building of the new Cactus House has also entailed a considerable amount of ground work around the house.

HAND-LIST OF TENDER DICOTYLEDONS.—During the year the second edition of this Hand-list was published, taking the place of the first edition which made its appearance so long ago as 1899. The limited sale of this Hand-list compared with the other Kew Hand-lists affords a criterion of the changed tastes in horticulture. For many years little interest has been taken in collections of choice indoor

plants, in striking contrast to the increasing popularity of flowering shrubs and trees, herbaceous and rock garden plants.

BIRDS.—During the past year the Storks built a nest at the top of a beech tree some 30 ft. high, near the Azalea garden. Two eggs were laid, but were unfortunately eaten by Carrion Crows. Later in the year the female Stork was found drowned in the Lake. A pair of young Storks have been imported from the Continent and it is hoped that they will breed at Kew as Storks have done in the past. The general collection of Ducks and Geese has been well maintained, and the stock of Mandarins, Blue-winged Teal, Carolinas, Cinnamon Teal, Pintails and Shovellers, has been increased.

RAINFALL RECORD.

Rainfall recorded at the Royal Botanic Gardens, Kew, during 1931 :

Inches.			Inches.		
January	...	0.95	July	...	2.89
February	...	1.66	August	...	5.33
March	...	0.21	September	...	2.27
April	...	3.22	October	...	0.64
May	...	2.38	November	...	2.03
June	...	1.45	December	...	0.58

Total 23.61 inches.

The total for 1930 was 24.99 inches.

STUDENT GARDENERS: CHANGES IN PERSONNEL.—Seventeen men completed their training; two others went to Mr. Cecil Hanbury's garden at La Mortola for a year, whilst the gardeners sent here for study in 1930, by H.M. the King of the Belgians and the Director of the Charles University Botanic Gardens, Prague, respectively, returned to their own countries.

Eighteen Student Gardeners were admitted for training; one man returned from La Mortola to complete his service, whilst two Students came from Malta, and one from Siam.

Of the seventeen men who finished their course, ten have secured appointments at home (Parks Departments six; private gardens or nurseries three; arterial roads for tree-planting one); whilst two others entered Reading University with scholarships awarded by the Ministry of Agriculture and Fisheries. Three men proceeded overseas:—one to Khartoum; one to Kimberley and one to Rhodesia. A German Student Gardener returned to Berlin in order to enter the Horticultural College in that city, and a Swiss student resumed duty in a nursery in his own country.

Seventeen of the new Student Gardeners are from Great Britain—(private gardens or nurseries eight; Royal Gardens, Windsor, one; Cheadle Royal Hospital Gardens, one; Parks Departments, four; Cambridge Botanic Gardens, one; John Innes Horticultural Institution, one; and Royal Horticultural Society's Gardens, Wisley, one). The Student Gardener from overseas is a native of Sweden and had worked in Germany and France before coming to Kew.

CONTRIBUTIONS TO THE GARDENS, 1931.—During the year 986 consignments of living plants, seeds, etc., were contributed to the Gardens. This number is the highest ever recorded, and is an increase of 36 on the previous year. The more important donations were as follows :—

Public Institutions :—

Amani, East African Agricultural Research Station.—A collection of plants, including some of economic value.

Berlin, Botanic Gardens.—Seeds: 88 packets, and a collection of *Rhododendrons*, *Ericas*, etc.

Bermuda, Department of Agriculture.—A collection of seeds, and a consignment of bulbs of *Lilium Harrisii*.

Bremen, Botanic Garden.—141 packets of seeds.

Bucharest, Botanic Gardens.—36 packets of seeds.

Buitenzorg, Botanic Gardens.—Seeds of economic plants.

Calcutta, Royal Botanic Gardens.—Seeds of *Musa* sp., and *Taraktogenos Kurzii*.

Cambridge, Botanic Garden.—Seeds, and plants of *Gloxinia maxima*.

Cambridge, Mass., Arnold Arboretum.—Seeds, plants and cuttings of hardy trees and shrubs.

Chelsea Physic Garden, London.—Seeds, and plants, including *Cycas circinalis*, *Ipomoea Purga*, and a collection of herbaceous plants.

Coimbra, Botanic Garden.—20 packets of seeds.

Copenhagen, Botanic Garden.—Plants of *Pellaea Smithii*, *Cyrtomium falcatum*, and miscellaneous seeds.

Cyprus, Department of Agriculture.—100 Corms of *Gladiolus segetum* and miscellaneous seeds.

Darjeeling, Lloyd Botanic Gardens.—197 packets of seeds.

Dehra Dun, Forest Research Institute.—Seeds of economic plants.

Dominica, Botanical Gardens.—A collection of tropical plants, including some of economic value.

Dunedin, Botanic Gardens.—270 packets of seeds.

Edinburgh, Royal Botanic Garden.—Seeds, including a share from the collections of Mr. George Forrest and Mr. Clarence Elliott; plants of *Ranunculus Lyallii*, *Primula sonchifolia*, *Vancouveria hexandra*, etc.

Formosa, University Botanic Garden.—33 packets of seeds.

Glasgow, Botanic Garden.—18 packets of seeds.

Glasnevin, Botanic Gardens.—Seeds and plants, including *Begonia barbata*, *Sarracenia* spp., etc.

Gothenburg, Botanic Gardens.—34 packets of seeds.

Kirstenbosch, National Botanic Garden.—Collections of seeds, bulbs and succulents.

Kuala Lumpur, Department of Agriculture.—Suckers of *Musas* in variety.

London, British Museum (Department of Botany).—Seedlings of *Nelumbium speciosum* from Manchurian peat.

- London, Hyde Park.—Collections of seeds, including 313 packets from Nepal, bedding and greenhouse plants in great variety, together with rare plants of special interest such as *Primula sonchifolia*, *Meconopsis regia*, etc.
- Merton, John Innes Horticultural Institution.—Plants and seeds including *Scolopendrium Delavayi*.
- Ottawa, Central Experimental Farm.—45 packets of seeds, and bulbs of *Lilium* spp.
- Oxford, Botanic Garden.—84 packets of seeds, and plants of *Dombeya Wallichii*.
- Paris, Museum d'Histoire Naturelle.—33 packets of seeds.
- Peradeniya, Department of Agriculture.—Seeds of *Eugenia aromatica*.
- Reading University, Horticultural Department.—A collection of Lachenalias.
- Singapore, Botanic Gardens.—Plants of *Borassodendron Machadonis*.
- Simla, Viceregal Gardens.—Miscellaneous seeds, and bulbs of *Lilium Thomsonianum*.
- Stellenbosch, University Botanic Garden.—81 packets of seeds.
- Stockholm, Botanic Garden.—Plant of *Reichsteineria macropoda*.
- Sydney, Botanic Gardens.—Seeds, including *Telopea speciosissima*.
- Tiflis, Botanic Garden.—46 packets of seeds.
- Trinidad and Tobago, Department of Agriculture.—Plants of *Neomammillaria mammilaris*.
- Washington, U.S. Department of Agriculture.—A collection of Azaleas, economic plants, etc.
- Wisley, Royal Horticultural Society's Gardens.—Seeds and plants, including *Viola orbelica* and *Helianthus* spp.
- Zanzibar, Department of Agriculture.—Seeds of *Eugenia aromatica*
- Private Donors :—*
- Mr. S. C. Atchley, Athens, Greece.—Collections of bulbs and seeds.
- Mr. G. P. Baker, Sevenoaks.—Plants and seeds, including *Iris cretica*.
- Mr. J. C. van Balen, Pretoria, Union of South Africa.—Seeds and a collection of *Aloe* spp.
- Mr. F. R. S. Balfour, Dawyck.—274 packets of seeds, collected by Mr. George Forrest.
- Miss Winsome Barker, Cape Town.—Collections of *Oxalis* spp., miscellaneous bulbs and seeds.
- Mr. A. C. Bartholomew, Reading.—39 packets of seeds.
- British Banana Co., Ltd., London.—Plants of Musas in variety.
- Mr. N. E. Brown, Kew.—Plants and seeds of succulents.
- Mr. E. G. Bryant, Prieska, Union of South Africa.—Seeds of *Welwitschia mirabilis*; plants, bulbs and seeds of South African plants.
- Mr. A. A. Cavanagh, Argentine.—A large collection of seeds.

- Lady Rosamond A. Christie, Instow.—A fine specimen plant of *Platycerium alcicorne*.
- Sir Jeremiah Colman, Bt., Gatton Park.—Plants of *Peristeria elata*.
- Mr. W. A. Constable, Paddock Wood.—Bulbs of *Liliums*, including *L. Jankae*.
- Mr. W. Cradwick, Mandeville, Jamaica, B.W.I.—A collection of orchids.
- Mr. C. H. Curtis, London.—Seeds of *Aloe* spp. from Transvaal.
- Mr. G. H. Dalrymple, Southampton.—A collection of *Freesias*.
- Mrs. A. Desborough, Broadstone, Dorset.—Plant of *Kniphofia Nelsoni*.
- Messrs. Duncan and Davies Ltd., New Plymouth, N.Z.—A small collection of endemic New Zealand plants.
- Messrs. Elders & Fyffes, Ltd., London.—Varieties of *Musa Cavendishii*.
- Mr. T. M. Endean, Laindon.—Succulents.
- Mr. W. C. Fishlock, Reading.—Plants of *Coffea erecta* and orchids collected on the Gold Coast.
- Mr. R. C. Bruce Gardner, Northwood.—Seeds of *Quercus* spp.
- Mr. A. Gibbs, Cardiff.—Plants of *Mesembryanthemum Bolusii*.
- Hon. Vicary Gibbs, Aldenham.—A collection of hardy trees and shrubs.
- Messrs. R. Gill & Son, Falmouth.—Plants of *Primula Winteri*, and hardy shrubs.
- Lady Godley, Gibraltar.—Seeds of *Quercus* spp., and a collection of bulbs, including *Narcissus serotinus*.
- Mr. G. Grout, Fort Jameson.—Plants of *Angraecum* sp.
- Dr. P. L. Giuseppe, Felixstowe.—68 packets of seeds.
- Mr. Cecil Hanbury, La Mortola.—61 packets of seeds, cuttings of *Citrus* spp., and *Pelargoniums*.
- Mr. F. J. Hanbury, East Grinstead.—A collection of *Dendrobium* spp.
- The Marquess of Headfort, Kells, Co. Meath.—Hardy trees and shrubs, including *Libocedrus tetragona*.
- Sir A. W. Hill, Kew.—Seeds and plants, including *Platycerium angolense*, *Huernia keniensis*, *Notonia Grantii*, etc., from Uganda and Kenya, and seeds of several species of *Pelargonium* and *Mesembryanthemum* from S. Africa.
- Messrs. Hillier & Sons, Winchester.—Hardy trees and shrubs, including *Prunus prostratus*.
- Miss D. C. Hopton, Bartestree.—41 packets of seeds of South African plants.
- Major F. O. Howes, Natal.—Seeds of *Jubaeopsis caffra*.
- Mrs. Sherman Hoyt, California.—2 large specimen plants of *Carnegiea (Cereus) gigantea*.
- Mr. C. E. Hubbard, Kew.—A large collection of seeds from Australia.
- Dr. H. H. Hu, Peiping, China.—Seeds of *Sinojackia Rehderiana*.

- Capt. H. A. Johnstone, Sao Paulo.—A collection of Palm seeds.
- Dr. A. F. G. Kerr, Bangkok.—Tubers of *Amorphophallus* spp.
- Mr. R. J. Kidston, Reading.—Seeds collected on North Baffin Island.
- Mr. C. H. Lankester, Costa Rica.—Orchids and stove plants.
- Mr. H. W. Lawton, Wellington.—A collection of New Zealand Veronics, seeds, etc.
- Lady Leconfield, Petworth Park.—Nerines.
- Mr. G. W. E. Loder, Ardingly.—Hardy trees and shrubs, including *Magnolia globosa*.
- Mr. F. R. Long, Port Elizabeth, Union of South Africa.—40 packets of seeds.
- Messrs. Mansell & Hatcher, Leeds.—A collection of Orchids and bulbs of *Lilium sulphureum*.
- Mr. B. P. Mansfield, Napier, N.Z.—Seeds of New Zealand plants.
- Mr. W. J. Marchant, Staplehill, Wimborne.—Plants, including *Rhus succedana*.
- Lt. Col. L. C. R. Messel, Handcross.—Plants of *Libocedrus chilensis*.
- Mr. F. W. Millard, East Grinstead.—A collection of Alpines.
- Col. G. Molyneux, Durban.—Plant of *Encephalartos latifrons*.
- Mr. C. T. Musgrave, Godalming.—Alpine and herbaceous plants.
- Lieut. C. Narangajavana, Siam.—A collection of Orchids.
- Mr. Oliver, Belize, British Honduras.—A collection of Orchids.
- Messrs. Oliver & Hunter, Moniaive.—A collection of Herbaceous plants.
- Major A. Pam, Broxbourne.—A collection of un-named tuberous plants from British Somaliland.
- Mr. N. S. Pillans, Cape Province.—Bulbs, plants and seeds from the Cape.
- Mr. W. Robinson, East Grinstead.—Hardy trees and shrubs.
- Major Lionel de Rothschild, Exbury.—183 packets of seeds collected by Mr. George Forrest.
- Hon. Mrs. E. Ryder, Beaulieu.—Seedling Mesembryanthemums, miscellaneous plants and seeds.
- Messrs. Sanders, St. Albans.—Orchids, including *Calanthe cardiloglossis* and *Coelogyne elata*.
- Mr. S. G. Saul, Beckenham.—Plants and seeds from New Zealand.
- Mr. T. Sharp, Westbury.—Succulents.
- Mr. F. S. Sillitoe, Malta.—Plants of *Montanoa Schottii*.
- Mr. F. L. Skinner, Manitoba.—Seeds of North American plants.
- Mr. F. W. Smith, Cap d'Antibes, France.—Cuttings of *Pelargonium capitatum*.
- Lady Beatrix Stanley, Madras.—Bulbs and seeds of *Lilium neilgherrense*.
- The Earl of Stair, Lochinch Castle.—Bulbs of *Lilium formosanum*.
- Major F. C. Stern, Goring-by-Sea.—Seeds, including collections made by Capt. Kingdon Ward, plants, and bulbs of *Lilium giganteum* var. *yunnanense*.

Lord Stonehaven, Ury, Stonehaven, N.B.—A collection of seeds of Australian plants.

Mr. G. M. Taylor, Portobello, N.B.—Seeds of *Lilium* spp., and plants of the old English Rose "Seven Sisters."

Mr. G. Thorncroft, Barberton, Transvaal.—Seeds of *Streptocarpus Dunnii* and a plant of *Euphorbia Evansii*.

Lt. Col. E. E. Todd, Gibraltar.—Plants of *Iris scorpioides*, and seeds collected in Gibraltar.

Dr. W. B. Turrill, Kew.—44 packets of seeds collected in the higher Alps.

Messrs. Vilmorin-Andrieux et Cie, Paris.—Seeds.

Sir Oscar Warburg, Epsom.—Hardy trees and shrubs.

Mr. J. C. Watt, Aberdeen.—Seeds of *Rubus bogotensis* and plants of *Primula Calderiana* and *Rhododendron Wightii* var. *leucochorum*.

Miss E. Willmott, Warley Place.—Seeds, and cuttings of *Salix Meyeriana*.

Messrs. K. Yashiroda Ltd., Japan.—Seeds of Japanese plants.

Mr. W. B. Yates, Mold.—Seeds collected in the Amazon district.

DISTRIBUTION OF PLANTS AND SEEDS.—In connection with the annual exchange of seeds, 177 consignments comprising 9,605 packets (hardy trees and shrubs 3,689; herbaceous plants 5,916) were despatched from Kew in the early part of the year. The work of distributing seeds of Tung Oil was again undertaken, and involved considerable time and labour in arranging for despatch, packing and shipping.

Amongst the seeds specially distributed were:—*Fraxinus australis*, *Caesalpinia spinosa*, *Alysicarpus rugosus*, *Streptocarpus Dunnii*, ? new species of *Cephalostachyum* from Lower Burma, *Aesculus indica*, *Sorghum margaretiferum*, *Ilex paraguariensis* var. *miniata*, and a large collection of Leguminosae from Malta.

Extensive shipments of plants raised at Kew, necessitating in many instances the use of Wardian cases, took place during the year, the following being a brief summary of the places to which they were despatched.

Botanic Gardens :—Ootacamund and Singapore.

Government House, Kaduna, Northern Provinces, Nigeria ; and Government House, Lagos, Nigeria.

Departments of Agriculture :—Gold Coast ; Bermuda ; British Guiana ; British Honduras ; Dominica ; Tanganyika Territory ; Ceylon ; Trinidad ; also to the East African Agricultural Research Station, Amani, Tanganyika Territory.

Advantage was taken of the Air Mail to East Africa in connection with the despatch of a small number of plants of *Pelargonium radula* var. *rosea*, to Nairobi, a larger number being sent later by sea.

Assistance was also given in the matter of receiving, caring for, and re-packing and despatching plants en route from one part of the world to another. These consignments included :—grafted walnut plants from France to Bhutan, India ; a Wardian case of plants of

Derris malaccensis from Kuala Lumpur to St. Clair Experiment Station, Trinidad ; plants of *Zizyphus Jujuba* bearing colonies of Lac insects to Ibadan, Nigeria ; a Wardian case of tropical plants from Peradeniya to Sierra Leone ; a Wardian case of plants of Julie and Sandersha mangos from Trinidad to Nairobi, also Japanese mint roots from the United States Department of Agriculture, Washington, to Nairobi. It is of interest to note that the plants of *Zizyphus*, referred to above, came from Ibadan, whilst the brood Lac, which was established on them at Kew, came by Air Mail from the Indian Lac Research Institute, Ranchi.

Other recipients of plants, etc., from Kew, included the following :—

Angora, British Embassy.—Shrubs and herbaceous plants.

Baarn, Holland, Phytopathologisch Laboratorium.—Grafts of species and varieties of *Ulmus*.

Bangor, University College of North Wales.—Plants and cuttings of succulents.

Berlin, Botanic Gardens.—Plants ; collection of Rhododendrons.

Biggin Hill, Royal Engineers.—Collection of trees and shrubs for grounds adjoining new buildings.

Cambridge, Botanic Garden.—Plant and seeds, including plants of *Macrozamia Dennisonii* and *Bowenia serrulata*.

Chelsea Physic Garden.—Stove and greenhouse plants.

Chesterfield, Parks and Cemeteries Department.—Collection of economic plants

Copenhagen, Botanical Museum.—Plants, including collections of Begonias and Rhododendrons.

Edinburgh, Royal Botanic Garden.—Plants and seeds.

Farnborough, Kent, Downe House.—Collection of shrubs.

Fiji, Director of Agriculture.—Seeds of economic plants.

Glasnevin, Botanic Gardens.—Collection of plants and seeds.

Isle of Man, Government Secretary.—Collection of cuttings of basket willows.

Kornik, Poland, Gardens and Arboretum.—Grafts of *Prunus*, *Pyrus*, *Populus* spp., etc.

London, Hyde Park—Plants.

Madras, Agri-Horticultural Society.—Tubers of *Nymphaea* spp. and seeds of *Nelumbium speciosum*.

Merton, John Innes Horticultural Institution.—Plants.

New York Botanical Garden, U.S.A.—Plants of *Drosera* spp. ; cuttings and seeds of *Begonia* spp.

Ottawa, Central Experimental Farm.—Seeds of *Lilium* spp.

Oxford, Botanic Garden.—Plant of *Selaginella laevigata* var. *Lyallii*.

Paris, Museum d'Histoire Naturelle.—Collection of aquatic and economic plants, also cuttings of *Pyrus* spp.

Prague, Charles University Botanic Garden.—Collection of plants.

Pretoria, Department of Agriculture, Division of Plant Industry.—Cuttings of *Salix caerulea alba* and seeds of *Aesculus indica*.

- Princes Risborough, Forest Products Research Laboratory.—Collection of shrubs and creepers.
- Reading University, Horticultural Department.—Plants of *Lachenalia* spp.
- Seychelles, Department of Agriculture.—Fruits of *Raphia vinifera* received from Sierra Leone.
- Slough, Admiralty Compass Observatory.—Collection of trees and shrubs.
- St. Helena, the Horticultural Officer.—A collection of succulents, and of seeds of *Lilium* spp.
- Teddington, National Physical Laboratory.—Collection of trees and shrubs.
- Tenerife, Canary Islands (Jardin de Aclimatacion).—Plants, cuttings and seeds.
- Washington, U.S. Department of Agriculture.—Grafts of *Corylus* spp.
- Mr. G. P. Baker, Sevenoaks.—Plants, including *Metrosideros scandens* and *Ozothamnus obcordatus*.
- Mr. W. Cradwick, Mandeville, Jamaica, B.W.I.—Plants, bulbs and corms.
- Dartington Hall Ltd., Totnes, Devon.—Collection of plants, cuttings and seeds.
- Mr. C. S. Garnett, Derby.—Plants—*Bomarea Carderi*, *Aristolochia grandiflora* var. *Sturtevantii*.
- Hon. Vicary Gibbs, Aldenham.—Collection of trees and shrubs.
- Mr. Cecil Hanbury, La Mortola.—Plants and seeds.
- The Marquess of Headfort, Kells, Co. Meath.—Collection of plants, including conifers.
- Messrs. Mansell & Hatcher Ltd., Leeds.—Collection of plants—orchids, etc.
- Mr. W. J. Marchant, Staplehill, Wimborne.—Plants—*Lomatia fraxinifolia*, *Correa speciosa* var. *ventricosa*, *Lyonothamnus floribundus*, etc.
- Orange County Fern Growers Association, Florida, U.S.A.—Plants of 12 spp. of *Sansevieria*.
- Hon. Mrs. E. Ryder, Beaulieu.—Seedlings of *Lilium Brownii*; plants of *Berberis lologensis*, and species of *Erica*, *Calluna* and *Rhododendron*.
- Major H. F. Ward, Nairobi.—Plants—including *Mussaenda erythrophylla*, *Turnera ulmifolia* var. *elegans*, and seeds of *Rhodochiton volubile*.
- Messrs. F. Gomer Waterer's Knap Hill Nursery Ltd., Woking.—Plants, cuttings and seeds.

National Pinetum at Bedgebury.

The general condition of the young Conifers in the Bedgebury Pinetum throughout 1931 was satisfactory, although in some instances insect pests and fungus diseases were troublesome and a few plants were killed by them.

As the growing season was delayed by a cold spring, young shoots escaped injury from late frosts, which, in conjunction with the abnormally wet summer, resulted in healthy and vigorous growth, many of the stronger-growing species adding two feet or more to their height. Even in September growth was active, and, as there was a distinct tendency for the terminal buds of many species to break into new growth about the end of the month, it was feared that the wood would not become sufficiently ripened to withstand winter cold. However, the sunnier and drier weather of October, with several frosty nights, had a salutary effect, and although 18 and 19 degrees of frost were registered on successive nights serious injury to young shoots has not been noticed, although the younger leaves of *Rhododendron ponticum* and a few other species were discoloured.

Early in the summer several vigorous young trees lost their leading shoots, presumably through birds alighting upon them while they were soft. The worst sufferers were species of *Abies* and *Picea*. These trees will probably form new leaders but a year or two's growth will be lost. Some of the trees are far enough advanced for the removal of a number of the lower branches. In certain genera the object in view is to encourage the development of a definite length of trunk free from branches; in other cases pruning will be restricted to the correction of unequal development and to keeping leading shoots free from rivals.

As in the last two years, the most troublesome insect pests were green aphid on spruce and species of *Dreyfusia* on *Abies*. The former insect seems to breed throughout the year and, despite periodical spraying, new broods constantly appear, the source of infection being large trees in the vicinity that cannot be sprayed. A curious fact has been noticed in connection with *Picea sitchensis*, for, whereas planted trees are peculiarly susceptible to infestation by *Aphis abietina*, natural seedlings of the same species have either not been attacked, or the attack has been so slight as to escape notice.

Pine weevils and pine beetles which were so troublesome a few years ago have mostly disappeared, and although a few colonies of pine sawfly have been found, the early destruction of the caterpillars has kept the pest in check. Pine-shoot tortrix moth is still found, but hand-picking of affected shoots has prevented widespread trouble. Larvae of the moth *Dichomeris marginella* have been found in large numbers on various species of juniper. Their presence is noticeable by the matting together of clusters of leaves. As this moth attacks wild plants of *Juniperus communis*, it is likely to be a recurring pest. The larch shoot moth *Argyresthia laevigatella* was not so abundant as in previous years although its presence is still noticeable.

The most serious fungus diseases were honey fungus (*Armillaria mellea*), and Weymouth pine rust (*Cronartium ribicolum*), and it is difficult to counteract their attacks, for in the one case there are hundreds of rotting tree stumps in the ground in which honey fungus is rampant, and in the other case it is impossible to eradicate currant

bushes from what is essentially part of the fruit producing district of Kent. Amongst trees lost through honey fungus was a very vigorous young tree of *Pinus Coulteri* 6 feet high, whereas several five-leaved pines have succumbed to Weymouth pine rust.

As various areas in the pinetum lend themselves to wild gardening effects at little more than the cost of planting, the Committee have arranged for grouping suitable plants on an extensive scale, keeping in mind the more attractive plants that are natural to the place. Already there are large areas of bluebells, foxgloves, violets, bugle, ladies' smock, ling and other plants. These are being encouraged and coarse weeds checked. By encouraging the development of ling during the last three years one of the avenues and some of the banks are now well covered, and the encouragement of primroses on a long grassy bank has also been attended by happy results. On the mud banks in Marshall's Lake masses of *Iris sibirica*, *I. Pseudacorus*, *I. orientalis*, *Primula japonica*, *P. pulverulenta*, *Senecio clivorum*, and *Mimulus luteus* have been planted, whilst in other places species of *Hemerocallis*, *Funkia*, and *Spiraea Aruncus* have been grouped. In a small plantation of oak left for purposes of shelter, it is hoped to establish a ground covering of lily of the valley. Amongst shrubby vegetation, masses of evergreen and deciduous rhododendrons, and mountain pines are being planted. These plants are either surplus stock from Kew or they have been given by interested people. It is hoped that the more vigorous exotic species will smother coarse weeds, be less susceptible to fire, and no more costly to control than strong grasses and other natural vegetation, whereas at intervals effective floral displays will be forthcoming.

In addition to the ordinary upkeep work of the past season the old and dangerous wooden bridge at the end of Marshall's Lake has been rebuilt, and 150 pipes have been laid in ditches crossing avenues as a commencement towards making the avenues more convenient for visitors.

During the year numerous people have been given permission to inspect the pinetum and a party of members attending the Annual Meeting of the British Association visited the place on September 26th. This party, consisting of botanists and foresters, expressed great satisfaction with what they saw. A party of Student Gardeners from Kew was taken to Bedgebury in April in connection with the course of lectures on arboriculture and forestry.

The Museums.

The volume of routine work, such as correspondence and the identification of specimens, maintained the high standard of the last few years, whilst there was an increase of visitors calling at the Museums for information upon the economic products of plants and other matters. Reciprocal work was also conducted between the Museums and the Forestry Commission, the Imperial Forestry

Institute, the Forest Products Research Laboratory and the Imperial Institute.

The overhaul of the specimens in Museum No. 1, begun in 1930, was completed. During this work the opportunity was taken of discarding duplicate specimens and of replacing some of the others by fresh material. It is hoped to replace the old dried specimens of drug plants by new samples during 1932.

A good deal of work was carried out in connection with the Arboretum Herbarium which is now included in the Museums Department. Several hundreds of new specimens were added and considerable progress was made in completing specimens where flowers or fruits were missing. A beginning was also made in building up a collection of dried specimens of Conifers for transmission to the National Pinetum at Bedgebury at some future date.

Considerable progress was made in indexing articles on plant products which have appeared over a number of years in various periodicals. Easy references to such articles is very necessary when abstruse questions from distant countries are under consideration.

During the year the following articles by members of the Museum staff appeared in the *Kew Bulletin* :—Keeper, The National Pinetum at Bedgebury, First Quinquennial Report ; Mr. J. H. Holland, Introduction of Cinchona into India ; Mr. F. N. Howes, The Loofah Industry ; Mr. J. H. Holland also prepared an account of Ledger Bark and Red Bark which will be published in the same journal.

By permission of the Director a good deal of technical assistance was given to the Royal Horticultural Society in the preparatory work connected with the Conifer Conference held by the Society in November, and a paper was read at the Conference by the Keeper on the Economic Uses of the Coniferae. At the close of the Conference a large number of specimens was acquired for incorporation in the Herbarium Collections at Kew. By permission of the Director the Keeper responded to an invitation by the Council for the Preservation of Rural England to give an address upon " The Care of Trees on the Sides of Public Roads " at their Annual Meeting at Bath. The address was afterwards widely distributed by the Council. The Keeper has continued to act as Executive Officer for the Pinetum at Bedgebury.

Three hundred duplicate specimens were distributed to various schools and institutions and numerous specimens were acquired.

PRESENTATIONS TO MUSEUMS.—Among the numerous presentations the following are deserving of special notice :—

Chief Conservator of Forests, Gold Coast.—Case of 98 named hand specimens of Gold Coast Woods.

Director, Department of Agriculture, S. Rhodesia.—Seeds of five cultivated forms of *Phaseolus* spp.

Miss E. T. Masters, 9, Mount Avenue, Ealing, W.5.—Portrait of the late Dr. Maxwell T. Masters.

Mr. James Newton, 11 Perry Hill, Catford, S.E.6.—Four Showcards of Commercial Plant Products as mounted for teaching purposes.

Mr. R. Barclay Fox, Penjerrick, Falmouth.—Four logs of wood of rare trees grown at Penjerrick.

Director, Imperial Institute.—Oil distilled from wood of *Fokienia Hodginsii* supplied from Kew.

Mr. S. L. M. Avery, Greystones, Longford Avenue, Southall.—Section of an oak beam taken from a building in Cheapside during alterations in 1929, the premises being part of a block of property that escaped the Great Fire of 1666.

Director, Botanic Garden, Singapore.—Sixteen hand specimens of timber.

Dr. I. B. Pole-Evans, Division of Plant Industry, Pretoria.—Set of photographs of *Welwitschia*.

Messrs. Wm. Hunt & Sons (The Brades Ltd.), Brades Steel Works, Nr. Birmingham.—Set of Forestry Tools to replace the former set in Museum No. 4.

The Director, Forest Products Research Laboratory, Princes Risborough.—Hand specimens of wood of three species of *Entandrophragma*.

Lt.-Col. Sir David Prain, The Well Farm, Warlingham.—Eight photographs of twisted trees.

Mr. F. S. Collier, Conservator of Forests, Victoria, Cameroons, W. Africa.—Seven specimens of wood.

Mr. R. E. Holttum, Singapore Botanic Gardens.—Twenty hand specimens of wood.

Messrs. Courtaulds Ltd., 16 St. Martin's le Grand, London, E.C.1.—Specimens of Rayon yarns and textiles made from Spruce wood.

The President and Council, Royal Horticultural Society.—Cut specimens of Conifers exhibited at the Conifer Conference.

Major V. B. D. Cooper, 22, Buckingham Gate, S.W.1.—Plant, dry stem and fibre of *Erbifex*.

Mrs. Hartshorne, 48, Fitzjohn's Avenue, N.W.3.—Twenty-eight drawings of Conifers and one photograph, originals of illustrations which appear in the *Pinetum Britannicum* edited by Edward Ravenscroft.

The Marquess of Headfort, Kells, Co. Meath.—Thirty photographs of Conifers growing at Kells.

The Jodrell Laboratory.

A collection of miscellaneous material, consisting chiefly of timbers, fibres, barks, and parts of plants used for medicinal purposes, has been examined with a view to identifying it from a study of its anatomy. Recently much valuable assistance in this work has been afforded by Mr. L. A. Boodle, the late assistant keeper of the

Laboratory. His long experience and unusually wide knowledge of anatomy have been of the greatest possible help.

A good example of the errors that may be avoided by the use of anatomical methods in the identification of timber is afforded by the following instance. It had been suggested that Columbian Red Cedar (*Thuja gigantea*), owing to its heat- and moisture-resisting properties, should be used to construct new staging in part of the Orchid House. During construction it was suspected that the Columbian Red Cedar supplied for the purpose was not all alike. Samples of it were accordingly examined and it was found that a certain proportion of the timber supplied was Douglas Fir, an unsuitable timber for the purpose.

It is evident that routine work could be considerably simplified by forming a collection of permanent microscopical preparations of authentically named specimens of the various woods, roots, barks, seeds, etc., for comparison with the material received for identification. Such a collection has been started, special attention having been devoted to timbers. This has been made possible by the use of the newly acquired apparatus mentioned in the report for 1930. A collection of microtome sections has been prepared, comprising mostly coniferous woods but including also many of the Meliaceae and a collection of Burmese and other miscellaneous woods. Slides of over 400 species from about 55 families, have been filed in special holders in a card-index cabinet, the families being arranged according to the "Genera plantarum," and the genera within the families in alphabetical order. A few of the slides have been acquired from the Forest Products Research Laboratory, Princes Risborough, and from the Imperial Forestry Institute, Oxford, with both of which institutions exchanges of slides have been effected. The wide scope of the enquiries received at the laboratory has necessitated the preparation of a card-index, in which papers which will be of use are filed, usually under the heading of both author and subject. It is hoped that this embryonic index may in time grow to be of considerable value in the work of the laboratory.

A visit was paid by the Assistant Keeper to the "Congrès International du Bois et de la Sylviculture" held in Paris from July 1st-6th, which was of especial interest as the occasion of the formation of an International Association of Wood Anatomists.

Investigations are in progress on the structure and taxonomy of little-known scented woods, chiefly from Bangkok, East Africa and India, and the comparative anatomy of the stem in the genus *Veronica*.

The following have worked at the laboratory during 1931:—

Miss M. E. Odell completed her work on the cuticles of some modern and fossilized plants.

Mr. Garrett-Jones, general botanical studies.

Mr. F. M. T. Norstad worked on the embryology of the Campanulaceae.

Mr. C. V. B. Marquand studied the liverwort *Exormotheca megastomata* Marquand.

Miss E. M. Wakefield has used the laboratory for the growth and examination of fungi in pure culture.

The Herbarium.

The year 1931 was chiefly occupied with an attempt to keep pace with the routine work of naming current collections and the completion of matters outstanding from the International Botanical Congress of 1930. Except for a few weeks before and after the Centenary Meeting in London of the British Association for the Advancement of Science, there were decidedly fewer visitors than usual, and this gave more opportunity to proceed with the work of naming very large collections recently acquired, chiefly through the assistance provided for travel by the Empire Marketing Board.

The congested state of the Herbarium and the urgent need of increased accommodation for the great number of accessions of specimens from all parts of the Empire was brought to the notice of the Royal Commission on Museums and Galleries in 1927 (*see* Report of Oral Evidence, p. 7). The Commissioners, fully realising the importance of the need of a new building, referred to the urgency of the matter in their Final Report (*see* Final Report, part II, p. 90). In view of the opinions expressed by the Commissioners, the Director set out the need in a minute to the Ministry and recommended that a new West wing should be added to the existing Herbarium building at right angles to the South wing, which was erected in the years 1901-3 under the Directorship of Sir William Thiselton-Dyer. Sanction was given to the proposal by the Treasury in 1930 and plans were drawn up for the new wing by Mr. J. H. Markham, H.M. Office of Works, in consultation with the Director.

Work was started on the new building early in 1931, Messrs. A. Roberts & Co., Ltd., of Kensington, being the Builders and Contractors. The actual building was completed towards the close of the year and certain internal fittings, such as heating apparatus, the electric light wiring and balustradings were installed. The completion of the interior and the installation of the other fittings will be carried out during the course of 1932, and it is hoped that the new wing may be ready for occupation during the summer.

The new West wing consists of four floors, instead of three as in the two existing wings, but the total height of the building is approximately the same. The cabinets will reach from floor to ceiling along the galleries surrounding the large well, which is provided with top lights. The passages around the galleries have been arranged on the outside of the supporting pillars, so that the bays, each of which has its own window, will be completely walled on either side by the cabinets. On each floor at the south end a private room has been provided. Access to the new wing will be from the west end of the South wing.

A further addition has been the provision of new lavatories on the ground and first floors, at the back of the Library corridor leading from the old East wing to the South wing. The stokehold also has been enlarged and rebuilt and a new heating apparatus installed.

EUROPE, NORTH AFRICA, AND THE ORIENT.

Over 12,000 sheets were mounted, poisoned, and incorporated in the Herbarium.

Considerable advance has to be recorded in rearranging genera in the General Herbarium. The following genera, amongst others, have been written up during the year according to recent monographs, standard lists, or floras:—*Ajuga*, *Carthamus*, *Centaureum*, *Echinops*, *Erigeron*, *Filago*, *Globularia*, *Hyacinthus*, *Lactuca*, *Lamium*, *Lythrum*, *Ornithogalum*, *Parietaria*, *Phlomis*, *Scilla*, *Scorzonera*, *Scutellaria*, *Sedum*, *Sideritis*, *Tragopogon*, and *Teucrium*.

The Balkan Peninsula again figures largely amongst the areas from which collections have been received. From Greece many valuable parcels have been received from Mr. S. C. Atchley, and Dr. P. L. Giuseppe presented his plants from Crete and Euboea. The Hon. H. G. Chick has commenced collecting in Greek Macedonia, and his activities have already enriched the Herbarium by species previously unrepresented. Mr. B. Gilliat-Smith has sent 300 sheets of Bosnian plants, and Mr. H. Griffith Tedd continues to explore with increasing interest and success the coastal and mountain areas of Thrace. Prof. Stoyanoff and Messrs. Stefanoff and Jordanoff have contributed rare Bulgarian plants.

Other important collections, apart from those purchased or obtained in exchange, were several useful consignments from the Island of Cyprus, to which special attention has been paid during recent years. Mr. C. H. Wyatt's Corsican collection included many endemics of rare occurrence, which were poorly represented in the old exsiccata. His specimens of *Crepis* afforded an opportunity for reduction of two supposed species, in which reduction Prof. Babcock concurs. From areas hitherto unexplored in Iraq the Rev. F. A. Rogers sent numerous parcels of plants which, moreover, were little represented in any herbarium. With his help and that of Mr. Evan Guest, of the Rustam Experimental Farm, a collection should be built up which will be most valuable when the time comes for the publication of a flora of this region. The Majorcan collections have been greatly enriched by the good specimens of Miss M. E. Edmonds and Mrs. N. E. Parry. An interesting collection from Jan Mayen was also received (*see* p. 35). From Algeria Colonel R. Meinertzhagen sent a collection of carefully prepared specimens of considerable interest from a little known district. A further well prepared collection by Mr. A. W. Trethewy from Morocco, coming as it does from a different area from his 1930 collection, included additional and interesting species, and does much to augment the Moroccan section of the North African flora in the Herbarium.

Miss E. Willmott presented to the Herbarium a collection of 840 specimens, made in the Pyrenees by Baron Philippe Picot La Peyrouse and given to her by M. Maurice Barbey de Bude. La Peyrouse (1744-1818) described many new species from this interesting region, and probably many of these specimens are syntypes.

The Government Botanist of Queensland, Mr. C. T. White, has presented a set of George Don's *Herbarium Britannicum*, fascicles I-VIII, containing altogether 200 sheets of specimens. Each fascicle comprises 25 sheets and was issued in book form with printed title-pages, the first dated 1804 and the last 1806. It appears from Dr. G. Claridge Druce's articles on George Don's life and work, published in the *Scottish Naturalist*, vols. vii and viii (1883-85), that a ninth fascicle of the *Herbarium Britannicum* was issued. Among the more interesting plants in the collection are *Eriocaulon septangulare*, from the Isle of Skye, *Eriophorum alpinum*, from near Forfar, long since extinct, the remarkable *Stellaria scapigera*, and *Potentilla opaca*, the last named being the only one of "G. Don's reputed discoveries" mentioned in the Appendix to Hooker's *Student's Flora*.

Research and Publications.—"Rorippa pyrenaica and closely allied species" (Bull. Soc. bot. Bulg. iv. 48: 1931).

"Vegetation of the Balkan Peninsula" (Journ. Ecol. xix. 217: 1931).

"Notes on new or rare *Hyperica*" (K.B. 1931, 29).

"On the Flora of the Nearer East, X." (K.B. 1931, 453).

"Climatic factors governing the distribution of plants" (Gard. Chron. xc. 313, 331: 1931). A paper read to Section K. of the British Association Centenary Meeting, London, 1931.

ASIA.

CHINA AND NORTHERN ASIA.—The rearrangement of the Chinese material of more than a dozen genera has been carried out, and several important genera have been written up from monographs. The routine work of the year has been marked by the large number of living specimens belonging to critical genera which have been received for identification, in addition to dried material forwarded from China. Many specimens have been sent on loan to various botanical establishments and have been returned with the monographer's observations. The extraction and return of this material entails much time, which is compensated for by the value of the identifications received, especially in the case of a flora such as that of China. Further progress has been made with the naming of Captain Kingdon Ward's collection from Upper Burma. In the course of identification of his plants it has been necessary to make detailed critical investigations of a number of genera, especially *Aconitum*, *Dentella* and *Leycesteria*.

Research and Publications.—Further research has been carried out on the Gentianaceae, and a systematic paper on all the cultivated

species is almost ready for publication. The following papers appeared during the year :—

“ New Asiatic Gentians ” (*K.B.* 1931, p. 68).

“ *Allia praesertim Sinensia nova vel minus cognita* ” (*Notes Roy. Bot. Gard. Edinb.* xvi. 135 : 1931).

“ The Botanical Name of the Japanese ‘ Old Woman ’ Lily ” (*K.B.* 1931, p. 159).

INDO-MALAYA.—Owing to continued pressure on space, the bulk of the specimens from the Malay Archipelago and the Philippine Islands referred to in last year’s Review still remain in the Store. Most of the current collections, however, have been incorporated in the Herbarium.

Important contributions were received from the Botanic Gardens, Singapore, the Forest Department of the Federated Malay States, the Forestry Department in British North Borneo, the Forest Botanist, Burma, and the Government Systematic Botanist, Madras. A collection made in the South Lushai Hills of Assam was presented by the Rev. W. J. L. Wenger.

Research and Publications.—Part IX. of the Flora of the Presidency of Madras, comprising the families *Commelinaceae* to *Cyperaceae*, was published early in the year. The preparation of the last family, the *Gramineae*, is well in hand. The review of the collection of plants sent by Koenig to Retzius, referred to last year, has been completed ; it is hoped to publish the results early in 1932.

The following publications prepared wholly or in part at the Kew Herbarium have appeared during the year :—

“ *Dioscorea* : section *Stenocorea*,” by D. Prain and I. H. Burkill (*K.B.* 1931, p. 88).

“ *Dioscoreae Novae Asiaticae*,” by D. Prain and I. H. Burkill (*K.B.* 1931, p. 245).

“ Additions to the Flora of Borneo and Other Malay Islands : II.”, by H. N. Ridley (*K.B.* 1931, p. 33).

“ Contributions to the Flora of Siam,” by W. G. Craib and E. T. Geddes, Additamenta XXX., XXXI., and XXXII. (*K.B.* 1931, pp. 206, 275 and 441).

“ Introduction of *Cinchona* to India ” (*K.B.* 1931, p. 113).

“ Contributions to the Flora of Burma : IX.” (*K.B.* 1931, p. 26).

“ Plants new to Assam : III.” (*K.B.* 1931, p. 281).

AFRICA.

As is usually the case the African staff has been mainly engaged in naming current collections, of which there have been large and very numerous consignments during the year. Nearly 10,000 specimens have been received for determination from Tropical Africa, mainly from East Africa.

Considerable progress has been made towards the completion of Vol. IX., Part V. of the Flora of Tropical Africa and it is hoped that this will be ready for the press early in 1932. The last Part of the

Flora of West Tropical Africa has been proceeded with, and now only the Cyperaceae and Gramineae remain to be worked out. Advantage was taken of a visit by Mr. George Rattray, of East London, Cape Province, whose field-knowledge of South African Cycads is well known, to secure his collaboration with Mr. J. Hutchinson in preparing an account of this family as a Supplement to the Flora Capensis. The Government of the Union of South Africa has kindly consented to assist financially in the publication of this supplemental volume.

WEST TROPICAL AFRICA.—Now that the publication of the Dicotyledons in the Flora of West Tropical Africa has been completed, determinations of collections from this area have been greatly facilitated. Some important additional species from remote districts have been received, however, which will be included in the Addenda at the end of the work. These include the late Major Chipp's collection from the Hoggar Mountains, Central Sahara, and that of Colonel R. Meinertzhagen from the same region. They add a fairly considerable Mediterranean element to the Flora, and require very critical examination.

Messrs. F. C. Deighton and R. R. Glanville have, as before, contributed important collections from Sierra Leone, including economic and cultivated plants for determination. Gold Coast plants have been received from Mr. T. Lloyd Williams, Mr. A. S. Thomas and Dr. F. R. Irvine, but the bulk have come through the Imperial Forestry Institute, Oxford. Mr. H. V. Lely continues to add species to the Flora from the Bauchi Plateau, and all his recent collections will need to be worked out critically for the Addenda of the West African Flora, since they approach the eastern boundary. The same treatment will be accorded to Mr. T. D. Maitland's large collections from the British Cameroons, whence additional species may be expected for a long time to come. From Nigeria Mr. J. D. Kennedy and Mr. F. H. Espley have contributed small collections from the forest region, whence good specimens are much to be desired.

CAMEROONS AND CONGO.—Whilst fairly good collections of plants exist from the Cameroons, the Congo flora is still very poorly represented in the Herbarium. Collections are particularly needed from the regions of the Congo bordering on the great lakes and the Rift Valley and from Katanga. The incorporation of Kässner's plants during the year has filled some blanks, but many more specimens are needed. A consignment of 94 Compositae from various localities near the western shore of Lake Tanganyika was received from the Musée du Congo Belge, Tervueren, Belgium. These are well prepared specimens and have proved to be of considerable interest, largely supplementing Kässner's collection.

NORTH-EAST TROPICAL AFRICA.—From the Sudan, Major G. Aylmer has sent over a hundred plants requiring critical determination, and in the southern area Mr. G. O. Whitehead made a small

collection. Mr. N. D. Simpson has added nearly 200 specimens from his investigation of the flora of the Nile Basin.

EAST TROPICAL AFRICA.—The East African Mountains continue to interest travellers and botanists. On Mt. Elgon Major E. J. Lugard made a very large and representative collection, which will be particularly valuable for the contemplated Flora of East Tropical Africa. Specimens of about 700 numbers were gathered, and it has been possible to make two duplicate sets. It is expected that a number of novelties will be present in this collection. Messrs. G. W. L. Fishlock and G. L. R. Hancock collected a valuable series of specimens from the higher altitudes of Ruwenzori, paying special attention to the arborescent *Senecios*. Miss E. R. Napier has continued to send consignments from Kenya Colony forwarded on behalf of various collectors. The number of specimens from the Forestry Department has decreased considerably, since the forest flora is now so much better known.

Valuable specimens from Uganda were received from Mr. J. D. Snowden before his retirement, and later from Mr. C. G. Hansford.

The largest collections from Tanganyika Territory were made by Mr. B. D. Burt in the Shinyanga district, in addition to a fine series from the little explored Virunga Mountains, on which he collected with the assistance of a grant from the Empire Marketing Board. Mr. A. E. Harper and Mr. P. J. Greenway continued to send large series of rare or critical species, the latter including a selection of old material from the Amani herbarium. An important contribution of about 1000 sheets from the islands of Pemba and Zanzibar was received from Mr. J. H. Vaughan. These and Mr. Greenway's plants from the same islands will be included in the Flora of Zanzibar, which it is proposed to publish from the Amani Institute.

SOUTH TROPICAL AFRICA.—The determination of the Rhodesian plants collected by Mr. E. Milne-Redhead and by Mr. J. Hutchinson has been proceeded with, together with that of those collected by Dr. I. B. Pole-Evans during General Smuts' expedition in 1930 (see *K.B.* Annual Review 1930, p. 3). Advantage has been taken of the study of these large collections to revise critically much of the Rhodesian material already incorporated in the herbarium, and to determine a number of small collections awaiting identification in the Stores.

Several new collections were also received from Rhodesia during the year. From a distributional standpoint, a consignment of plants made by Señor A. F. de Gomes e Sousa near the Portuguese border of Swaziland proved of considerable interest. Mr. J. Gossweiler contributed a fine collection of about 350 specimens from Angola.

Research and Publications.—A revision of the East African species of *Canthium* has been prepared, and the following papers were published :—

“Flora of the Libyan Desert” (*K.B.* 1931, 161).

"General Smuts' Botanical Expedition to Northern Rhodesia" (*K.B.* 1931, 225).

"The Genus *Kraussia*" (*K.B.* 1931, 254).

"Tropical African Plants: VIII" (*K.B.* 1931, p. 270).

"The Arborescent *Senecios* of the Virunga Mts." (*K.B.* 1931, p. 289).

"The Genus *Haplocoelum*" (*K.B.* 1931, p. 353).

"African Orchids: II" (*K.B.* 1931, p. 378).

"North Eastern British Somaliland" (*K.B.* 1931, p. 401).

"The Genera *Tinnea* and *Renschia*" (*K.B.* 1931, p. 455).

SOUTH AFRICA.—Mr. E. E. Galpin continues to take an active interest in botanical collecting, and about 400 of his specimens have been received from the National Herbarium, Pretoria. An equal number has been presented by Dr. H. G. Fourcade, of Witte Els Bosch. Through Miss W. Barker, attached to the Bolus Herbarium in the service of Kew, by the aid of the Bentham Trustees, the Herbarium has benefited to the extent of about 400 beautifully dried plants, mostly of rare species grown at Kirstenbosch and raised from wild seed or bulbs. Amongst these was a large number of Monocotyledons with fugitive flowers difficult to dry properly in the field. Rare plants, including syntype specimens, have been sent by Mrs. F. Bolus, Mrs. M. R. Levyns, Mr. T. P. Stokoe and Mr. G. Thorncroft. Stimulated by the visits of various botanists, especially from Kew, Mr. F. R. Long, in charge of the Public Parks and Municipal Lands at Port Elizabeth, has commenced a local herbarium, from which Kew has received over 400 well dried specimens, which are of interest since they come from the transitional floral belt between the western and eastern regions of South Africa. A particularly valuable set of South African *Oxalis* was received from Captain T. M. Salter, consisting of some 165 beautifully dried specimens, including many rarities and some undescribed species.

Research and Publications.—Some progress has been made by the Assistant for South Africa, Mr. R. A. Dyer, with a Flora of the Albany and Bathurst Divisions of the Eastern Cape Province, during the time available from the naming of critical specimens and other routine work.

"Further Notes on *Lachnopylis*" (*K.B.* 1931, p. 39).

"A new *Harveya* from the Transvaal Highveld" (*K.B.* 1931, p. 65).

"*Palmstruckia* of the Flora Capensis" (*K.B.* 1931, p. 154).

"Notes upon South African Plants" (*K.B.* 1931, p. 191).

"Suggested Conservation of *Pollichia*" (*K.B.* 1931, p. 198).

AMERICA.

During the past year nearly 11,000 specimens have been mounted, and about 8000 sheets have been incorporated in the Herbarium. A number of valuable accessions have been made to the tropical

American collections, the more important being a series of duplicates from the Amazons, collected by Dr. A. Ducke, received in exchange from the Jardim Botânico, Rio de Janeiro ; from Surinam, received from the Rijks Universiteit, Utrecht ; from Cuba, collected by Dr. E. Ekman, contributed by the Riksmuseum, Stockholm ; from various parts of tropical America, presented by the Field Museum, Chicago ; and from North America, presented in exchange by the Missouri Botanical Garden. In addition further interesting parcels of plants were received from Mr. R. O. Williams from Trinidad ; and from British Guiana, some collected by the Government Botanist and others by officers of the Department of Forestry. The purchase of nearly 750 specimens collected in Haiti by Mr. E. C. Leonard greatly improved the representation of the flora of that island ; while other useful purchases were those from Schipp (British Honduras) and from Mr. J. W. Thompson (Olympic Mts., Washington).

The determination of the collection made in British Guiana in 1929 by the Oxford Expedition has been practically completed, this being the main piece of work accomplished during the year. The naming of the *Bignoniaceae* was attended with special difficulty, as this family is perhaps the least known of any in tropical America. Other collections from British Guiana have also been identified and incorporated. The residuum of important old collections made in tropical America, such as those of Ule, Tonduz, and Langlassé, has now been named and laid in. No time was available for the naming of plants from temperate America, owing to the more urgent need for the revision of tropical material already in the Herbarium, and for the incorporation of outstanding tropical collections. A very large number of undetermined *Rubiaceae* from East Tropical South America were determined by Dr. Paul C. Standley, of the Field Museum, Chicago, to whom they had been sent on loan.

A particularly valuable set of specimens was received from Miss L. A. Boyd after her 1931 expedition to North-east Greenland. The collection consisted of a series of flowering plants in very fine condition from Franz Josef Fjord and also a small series from the island of Jan Mayen. The main collection is preserved at the California Academy of Sciences, San Francisco, and a practically complete set of duplicates was presented to Kew.

Research and Publications.—The series of papers dealing with the botanical results of the Oxford University Expedition to British Guiana has been continued as follows : “ The Baromallis of British Guiana ” (*K.B.* 1931, p. 46) ; “ Saprophytes collected by the Oxford University Expedition to British Guiana, 1929 ” (*K.B.* 1931, p. 54) ; “ New and Noteworthy species from British Guiana, Dilleniaceae-Connaraceae ” (*K.B.* 1931, p. 170) ; “ New and Noteworthy Leguminosae and Rosaceae from British Guiana ” (including a key to the British Guiana species of *Eperua*) (*K.B.* 1931, p. 357). An investigation into the taxonomic limits, synonymy and geographical

distribution of the "Tara" tree of Peru, the pods of which are employed in tanning, appeared under the title "The Botanical Name of 'Tara'" (*K.B.* 1931, p. 91).

AUSTRALIA AND OCEANIA.

During the year various large miscellaneous collections have been received, totalling over 14,000 numbers in all, needing accurate determination.

The most outstanding of these collections was that made by Mr. C. E. Hubbard during his year's visit to Australia. This comprises over 6600 numbers, and about 75,000 specimens, most of which were gathered in Queensland. In addition Mr. Hubbard was kindly permitted by the Government Botanist (Mr. C. T. White) to extract duplicates of grasses from the Brisbane Herbarium, the total number so received being 1800. Since then, Kew has received from Mr. C. T. White many further collections of grasses, from various parts of Queensland, including a considerable number collected by Mr. L. J. Brass on the Gilbert River, and from other regions little known botanically.

Another important collection presented was the Herbarium of Mr. H. A. Longman, Director of the Queensland Museum, Brisbane. This includes over 1300 gatherings from Queensland and New South Wales and is a welcome and valuable gift.

Mr. C. T. White has further contributed an extremely valuable set of duplicates of types of Australian and Papuan species described by himself and Mr. W. D. Francis, most of which were previously unrepresented in the Kew Herbarium.

Other collections of Queensland plants were presented by Mrs. E. Thompson and by Mr. G. K. Jackson, while a particularly interesting set of duplicates of N. Queensland plants collected by Mr. S. F. Kajewski was received in exchange from the Arnold Arboretum.

Dr. F. A. Rodway of Nowra has continued to send useful consignments of New South Wales plants, while other collections from this State include specimens of grasses from the New England district by the Rev. E. N. McKie, and others presented by the Director of the National Herbarium, Sydney. A valuable series of New South Wales grasses, mostly from the vicinity of Sydney and the Blue Mountains, was presented for determination by Miss J. Vickery.

Victorian plants are represented among a large collection of duplicates from Dr. C. S. Sutton's herbarium, together with other plants from Tasmania and a smaller number from elsewhere. Further instalments of Tasmanian plants have also been purchased from the Tasmanian Museum.

One of the most interesting collections received during the year is the remainder of the plants, about 300 numbers, collected on the Mackay Exploring Expedition in northern South Australia and Central Australia by Dr. H. Basedow and presented by him. Many

of these were collected in areas previously unexplored botanically. Dr. Basedow also presented the specimens collected by him on the South Australian Medical Relief Expedition to the Aborigines in 1919. Dr. J. B. Cleland again generously presented about 600 duplicates of specimens from Central and South Australia, the majority of these being grasses.

Collections of South Australian plants were also received from Messrs. J. M. Black, E. H. Ising, J. F. Bailey, T. B. Paltridge and Dr. R. H. Pulleine, many of these being either very rare species or coming from localities of which the flora is very poorly known. Mr. Hubbard on his return journey made collections at different places along the Transcontinental Railway, particularly interesting plants being obtained at Barton, Hughes and Forrest.

Altogether, the Australian collections received represent a considerable addition to the Herbarium, not only as to the number of species, but also as extending the representation of their distribution.

From New Guinea a considerable collection, made by Mr. Gregory Bateson on the Sepik River during his anthropological studies, was received and named.

Publications.—"The Buttresses of Rain Forest Trees" (*K.B.* 1931, p. 24).

"A Raining or Weeping Tree in Australia" (*K.B.* 1931, p. 156).

"Two New Rutaceae from Queensland and New Guinea" (*K.B.* 1931, p. 188).

"*Eucalyptus patellaris*" (*K.B.* 1931, p. 285).

"The habitat of *Patersonia macrantha*" (*K.B.* 1931, p. 285).

"Notes on some Australian Monimiaceae" (*K.B.* 1931, p. 457).

OCEANIA.—The specimens of *Ficus* collected in the New Hebrides on behalf of the Arnold Arboretum have now been nearly worked out, and it is hoped to publish an account in the near future. A number of new species has been detected.

An important collection of Tongan plants was received from Prof. W. A. Setchell, and has been for the most part named. It is intended to work up the Tongan species of *Ficus* when those of the New Hebrides are completed, and Dr. Setchell has kindly sent on loan for this purpose all the material in the Californian Herbarium. Collections have also been received from the New Hebrides (Miss L. E. Cheesman) and from New Britain (Mr. G. Bateson).

Additional instalments of plants from Bougainville Island have been received from Mr. J. H. L. Waterhouse, who for some years has been collecting with the aid of a grant from the Empire Marketing Board. This collection now contains over 550 numbers, and is an important contribution from a flora which is very imperfectly known.

Further valuable collections of Fijian plants have been received from Mr. W. Greenwood and from Mrs. C. J. Parham, the latter from Vanua Levu, which is little known botanically.

PTERIDOPHYTA, THALLOPHYTA.

PTERIDOPHYTA.—There have been few large additions to the fern collection during the year, though several hundreds of specimens in small lots have been received. Two Jamaican collections were presented, one of 276 specimens by Mr. C. R. Orcutt, and another of 200 by Mr. Barclay Brown, through Toc H. Another smaller West Indian collection of 76 specimens was received from Miss E. M. Wakefield, who collected mainly in Trinidad and Dominica.

Mr. R. C. Ching prolonged his stay at Kew until May and continued his study of the Chinese Pteridophyta. At the same time he was able to revise the bulk of the Chinese fern herbarium of the Edinburgh Botanic Garden, which was forwarded to Kew for that purpose.

Over 2000 sheets were laid in during the year, the remainder of the material awaiting incorporation being housed in a special cabinet in alphabetical sequence of genera. No further re-arranging of the collections in accordance with Christensen's Index Filicum has been carried out this year.

FUNGI.—During the early part of the year considerable time was spent in rearranging certain groups of Ascomycetes in the Herbarium. In the old Saccardo arrangement the genera of comparatively recently distinguished families, such as the Microthyriaceae, were found scattered amongst the Perisporiaceae, Dothideaceae and Hysteriaceae. These have now been brought together and arranged on the basis of the latest Ascomycete Supplement (Vol. XXIV. of Saccardo's Sylloge). At the same time the genera still remaining in the Perisporiaceae were put in order, and certain small groups of Discomycetes, such as the Myriangiaceae, were also brought together. Although no attempt has been made to rearrange species, the genera included in these families will now be more easily available for consultation.

A considerable amount of material has again been added to the collections in the course of the year. Mr. E. J. H. Corner has continued to send Singapore Polyporaceae. The specimens are well chosen to illustrate variations in each species and are accompanied by valuable notes taken from the fresh specimens. Other important collections have been received from Uganda (Mr. C. G. Hansford), Rhodesia (Mr. J. C. F. Hopkins), Cameroons (Mr. T. D. Maitland), and India (Professor S. R. Bose, and Messrs. J. C. Sengupta and R. N. Parker), and Mr. R. N. Nattrass has made a beginning with the fungi of Cyprus. British fungi collected during forays have been added, in particular several interesting species collected during the foray of the British Mycological Society at Belfast.

Miscellaneous queries dealt with during the year were of the usual varied type, and much time has been spent in providing assistance to research workers at home and abroad by the examination of type specimens, and by loans of herbarium material, as well as by assistance in the naming of critical species. Among the more interesting

questions which were raised was one concerning a fungus, found in the gut of mosquito larvae, which was submitted by the Mosquito Control Institute at Hayling Island. This fungus has been submitted to experts in entomogenous fungi but was not recognised. It appears to be entirely new to Science and probably represents a new genus.

Work has been continued at intervals on the British Guiana fungi collected in 1929 by the Oxford University expedition, which have been supplemented during the year by interesting species sent by Mr. E. B. Martyn, the Mycologist for British Guiana.

BIOLOGICAL AND GENETICAL HERBARIA.

About 1500 specimens have been added to these collections during the year. These include: (1) further series illustrating the vegetation of Richmond Park and of the land-slide on the south coast of the Isle of Wight, (2) fine series from Mr. Edgar Thurston illustrating the life-histories of Cornish plants, (3) specimens of *Anthyllis*, *Silene*, *Centaurea*, *Saxifraga*, *Ranunculus*, and *Digitalis*, recording breeding and field studies.

SUMMARY.

The routine work, apart from naming, accomplished by the regular staff and by the special Store Staff during 1931 is summarised as follows:—

Mounted	...	...	...	...	...	50,000 (approx.)
Incorporated	...	...	...	...	...	40,829
Duplicates distributed	...	...	...	...	...	5370
Specimens received on loan	...	...	...	...	...	7390
Specimens sent out on loan	...	...	...	...	...	7451
Specimens presented or purchased	...	...	...	...	...	141,945

ILLUSTRATIONS AND PHOTOGRAPHS.

The Artist has been occupied chiefly with the preparation of plates from dried specimens for publication in the *Icones Plantarum*, Vol. II., part iii., which will be published early in 1932. In addition, drawings in colour and in monochrome have been made for the Herbarium collection.

About 250 herbarium sheets (mostly of type specimens borrowed from Continental and other herbaria) have been photographed for the Kew Collection, and approximately 700 Kew sheets have been photographed for other Institutions. A commencement has been made with the arrangement and indexing of photographic negatives in the Jodrell Laboratory.

In the course of private investigations the Artist has developed a method of photographing dried specimens on a smaller scale than is usual and of making positives by enlarged projection-printing. When suitable apparatus can be purchased, the introduction of this system will result in a considerable saving of cost in production of photographs of herbarium sheets.

The part-time services of Miss S. Ross-Craig have been enlisted by the Bentham Trustees to prepare some of the drawings for the *Icones Plantarum*, the *Kew Bulletin*, and the *Flora of West Tropical Africa*.

The drawings and photographs of plants received during the year include 70 original coloured drawings prepared for the *Botanical Magazine*, and 23 photographs, presented by the Royal Horticultural Society; 33 photographs of trees in the Adelaide Botanic Garden, from Mr. J. F. Bailey; 41 photographs mostly of type specimens of species of *Cordia* and *Pilea* from the Smithsonian Institution, Washington; 30 coloured plates from the *Flowering Plants of South Africa*, from Dr. I. B. Pole Evans; 16 proof plates of species of *Dioscorea*, prepared for the *Annals of the Royal Botanic Garden, Calcutta*, vol. xiv., from Mr. I. H. Burkill. Nineteen stereo-negatives of Australian Orchids have been purchased from Mr. T. Green, and 61 photographs of type and other specimens of *Aegiphila*, from Mr. H. L. Moldenke, and others from various sources.

The incorporation in the collection of the very numerous drawings and photographs received annually has been for a long time in arrears owing to pressure of other work. Thanks to the Bentham Trustees, Miss S. Wilson is now engaged on the work of mounting and arranging the drawings and it is hoped it will be possible to put the whole collection in working order.

The Kew collection of portraits of botanists has been enriched by the presentation, by Prof. R. E. Fries, of over 150 duplicates from the fine collection of portraits at the Bergielund Botanic Garden, Stockholm. Among them are several of Linnaeus and a number of old prints of some of the early herbalists. Swedish botanists are well represented in the collection and include J. G. Agardh, A. G. Nathorst, C. F. O. Nordstedt, Th. M. Fries, Th. C. E. Fries, and the donor, of whom there is an excellent photograph. Many of the portraits are taken from the third volume of the *Acta Horti Bergiani*. Other portraits received are of Dr. G. Claridge Druce and Mr. J. F. Bailey; and a coloured photograph, autographed and framed, of Samuel Curtis, at one time proprietor of *Curtis's Botanical Magazine*, together with a framed photograph of the "Trade Card" of William Curtis, which was probably used by him as a bookplate, have been presented by Dr. Henry Curtis, F.R.C.S.

A collection of 99 portraits, many of which have been reproduced from portraits at Kew, has just been published for the Royal Horticultural Society by Messrs. Quaritch in a volume entitled "Curtis's Botanical Magazine Dedications, 1827-1927: Portraits and Biographical Notes," compiled by Ernest Nelmes and William Cuthbertson. The volume opens with a portrait and biographical notice of William Curtis, the founder of the *Magazine*. The conception of this interesting volume, of which a copy has been received from the Royal Horticultural Society, is due to Mr. Cuthbertson, and the biographies have been prepared by Mr. Nelmes.

NOMENCLATURE AND BIBLIOGRAPHY.

Many enquiries concerning questions of nomenclature, received from correspondents both at home and abroad, have been dealt with, and references to the places of publication of numerous obscure names have been traced and supplied.

At the request of the Empire Forestry Association the scientific names in the List of Trade Names of Empire Timbers published in the Empire Forestry Handbook, 1931, were checked, and various amendments were suggested.

A copy of the proofs of the late Dr. Briquet's Report of the Nomenclature Proceedings of the Fifth International Botanical Congress was read for the press by Dr. Sprague. This Report will form the basis of the Third Edition of the International Rules.

The preparation of a list of well-known generic names which are later homonyms has been commenced. At the Cambridge Congress it was agreed to reject later homonyms on the definite understanding that any well-known generic names which would consequently be invalidated under this rule should be conserved.

Publications.—A paper dealing with the History and the Rules of Nomenclature appeared in the Empire Forestry Journal, x. No. I. pp. 54-72 (1931).

Under the heading "Additions to the Index Kewensis: XI." an account of Griffith's Itinerary Notes (Posthumous Papers, ii. ed. J. McClelland, 1848) was given in *K.B.* 1931, pp. 199-201.

INDEX KEWENSIS.

Throughout the year the work of compiling the Index Kewensis, Supplement VIII, has continued steadily. The present number of entries reaches about 28,000, and it is hoped that the preparation of the manuscript for the Press will be started early in 1932.

It may be noted that during the quinquennium covered (1926-30), an unusual number of new periodicals has appeared, such as: *Cavanillesia* (1928); *Journal of the Cactus and Succulent Society of America* (1929); *Bulletin de la Société Botanique de Bulgarie* (1926), and *Archives de Botanique, Caen* (1927). Although the number of new names contained in these periodicals may not be great, the time taken in going through them is considerable. About one month's work has been done in the Library of the British Museum (Natural History), where numerous periodicals not received at Kew have been searched.

The duplicating of the Card Catalogue has been commenced and will be completed early in 1932. For this work the Clarendon Press are generously making a grant in aid.

EXPERIMENTAL WORK.

The work at Potterne has been continued satisfactorily despite the unfavourable weather conditions. Research on *Ranunculus*

Ficaria is being extended by Mr. Marsden-Jones to include pollination studies. Back-cross and other generations involving *Saxifraga potternensis* were scored and large generations of seedlings have been raised for investigation in 1932.

Research on *Centaurea* was concentrated on floral characters of an intraspecific nature, including corolla-development and sex. New crossings and selfings were made, and many hundreds of plants were scored. *Ranunculus* sex-studies are awaiting cytological interpretation.

Large generations of *Silene*, both of bred and immediate wild origin, were scored and new crossings and selfings were made. Mr. Marsden-Jones studied a wild population of *S. vulgaris* in Berkshire, and Dr. Turrill spent three weeks in the French Alps investigating the occurrence of the Alpine varieties of *Silene* and their altitudinal and ecological distribution. As a result, large collections of herbarium specimens and of seed for raising fresh stocks have been received at Kew.

In the Herbarium Ground many plants from Persia and the Balkan Peninsula have been grown, in addition to material connected with the Potterne experiments. Two groups (each of 100 plants), of *Plantago maritima* have been grown for Dr. J. W. Gregor, of the Corstorphine Plant Breeding Station, with interesting results.

Publications.—"Researches on *Silene maritima* and *S. vulgaris* : V." *K.B.* 1931, 118; VI. *K.B.* 1931, 345; VII. *K.B.* 1931, 391.

"Biological races in seed-bearing plants and their significance in evolution" (*Ann. Appl. Biol.* xviii. 442: 1931).

"Flower mutations in the primrose" (*New Phyt.* xxx. 284: 1931).

"Species studies in plants" (*Rep. Bot. Exch. Club* 1930, 416: 1931).

TRANSPLANT EXPERIMENTS.

The second of the biennial series of reports has been prepared for publication in a forthcoming number of the *Journal of Ecology*. The 1931 results have been of exceptional interest on account of the number of factors recorded and the study of death-rates and their causes.

A plant of *Fragaria* has been cloned for transplanting early in 1932 and the Transplant Committee has also decided to experiment with material of diploid and hexaploid *Phleum pratense*.

VISITORS.

The number of signatures in the Visitors' book for 1931 was 5154. The following were amongst the most noteworthy or frequent visitors to the Herbarium:—

Mr. W. E. Bassett, late of Victoria Botanic Gardens, Cameroons, Mr. E. G. Baker, Mr. W. J. Bean, Mr. L. A. Boodle, Dr. F. Boergesen, Botanical Museum, Copenhagen, Mr. N. E. Brown, Prof. A. H. R. Buller, University of Manitoba, Winnipeg, Mr. I. H. Burkill, Dr. J. Burt Davy, Imperial Forestry Institute, Oxford, Dr. E. J. Butler, Imperial Mycological Institute, Kew.

Miss M. E. J. Chandler, Mr. R. C. Ching, Academia Sinica, Nanking, China, Prof. W. Y. Chun, Botanical Institute, Sun Yat-Sen University, Canton, Chaplain and Mrs. J. Clemens, Prof. W. G. Craib, Cruickshank Botanic Garden, Old Aberdeen, Mrs. J. W. Coombs, Botanical Garden, Bronx Park, New York.

Dr. J. M. Dalziel, Dr. and Mrs. B. H. Danser, University of Groningen, Holland, Mr. G. D. Darker, University of Toronto, Mr. H. N. Dixon, Dr. and Mrs. G. Du Rietz, The Royal University, Uppsala.

Dr. H. G. Fourcade, Prof. R. E. Fries, Bergianska Trädgården, Stockholm.

Mr. P. J. Greenway, East African Agricultural Research Station, Amani, Mr. W. B. Grove, Prof. T. H. Goodspeed, University of California.

M. Liou Ho, Saigon, Cochin China, Dr. D. Hooper, Mr. A. C. Hoyle, Imperial Forestry Institute, Oxford, Mr. R. E. Hunter, Imperial College of Tropical Agriculture, Trinidad.

Prof. M. O. P. Iyengar, Presidency College, Madras.

Miss M. C. Karsten, Gelderland.

Mrs. M. R. Levyns, The University, Cape Town, Dr. R. Lloyd Praeger, Dublin, Mr. T. Lloyd Williams, Department of Agriculture, Gold Coast.

Mr. E. W. Mason, Imperial Mycological Institute, Kew, Dr. A. Meebold, Heidenheim, Württemberg, Col. R. Meinertzhagen, Dr. Franklin P. Metcalfe, Lingnan University, Canton, Dr. P. A. Munz, Pomona College, Claremont, California.

Mr. C. Norman.

Miss M. W. Parke, Marine Biological Station, Port Erin, Mr. R. Paulson, Mr. T. Petch, Mr. W. R. Price, Mr. H. W. Pugsley.

Mr. George Rattray, East London, S. Africa, Mrs. E. M. Reid, Mr. P. W. Richards, Botany School, Cambridge, Mr. H. N. Ridley, Prof. W. Robyns, Jardin Botanique de l'Etat, Brussels, Mr. N. V. Rounce, Department of Agriculture, Tanganyika Territory.

Capt. T. M. Salter, Cape Town, Dr. G. Samuelsson, Naturhistoriska Riksmuseet, Stockholm, Mr. A. C. Smith, New York Botanical Garden, Prof. N. J. G. Smith, Rhodes University College, Grahamstown, Mr. J. D. Snowden, late of Agricultural Department, Uganda. Dr. O. Stapf and staff for Index Londinensis and Botanical Magazine.

Mr. C. G. Trapnell.

Dr. G. B. Wallace, Department of Agriculture, Tanganyika Territory. Dr. T. Wiśniewski, University, Warsaw, Lt.-Col. A. H. Wolley-Dod.

ADDITIONS TO HERBARIUM.

The total number of specimens received during 1931 was about 142,000, of which 2830 were purchased. The chief sources from which they were obtained are given below.

EUROPE.—*Presented* : Great Britain, by Messrs. F. Ballard, A. J. Crosfield, F. Druce, T. A. Dymes, G. H. Gooder, A. R. Horwood, J. E. Little, E. M. Marsden-Jones, R. Melville, E. Milne-Redhead, E. Nelves, W. E. Nicholson, N. Y. Sandwith, H. K. A. Shaw, E. Thurston, C. H. Wright, Rev. F. A. Rogers (Algae), Dr. G. C. Druce, Dr. T. A. Sprague, Dr. W. B. Turrill, Lady Douie, Miss Ida M. Hayward (per Dr. G. C. Druce), Mrs. C. Sandwith, Miss E. M. Wakefield (fungi), the Botanic Museum and Herbarium, Brisbane, per Mr. C. T. White (Herbarium Britannicum, by G. Don), East Malling Plant Research Station, and by the Watson Botanical Exchange Club (per Mr. E. C. Wallace) ; Balearic Islands, by Miss M. E. Edmonds, the Gray Herbarium, Harvard University (coll. Mrs. Sinclair Kennedy), and by Mrs. N. E. Parry ; Bulgaria, by Mr. B. Stefanoff, and by Prof. N. Stoyanoff, Flora Bulgarica Exsiccata ; Caucasus, by Leningrad Botanic Museum (coll. E. and N. Busch) ; Corsica, by Mr. C. H. Wyatt ; Crete, by Dr. P. L. Giuseppi ; Czechoslovakia, by Dr. K. Domin, Flora Českoslovenica Exsiccata, Century II., and by Dr. J. Podpera, Flora Exsiccata Republicae Bohemicae Slovenicae, Century VI. ; France, by Mr. C. H. Wyatt ; Greece, by Mr. S. C. Atchley, the Hon. H. G. Chick, Dr. P. L. Giuseppi, and by Mr. H. Griffith Tedd ; Iceland, by Col. R. Meinertzhagen (coll. Theresa Clay) ; Italy, by Mrs. Macalister Hall ; Malta, by Prof. J. Borg ; Norway, by Dr. W. Leach ; Rumania, by the Botanic Garden and Museum, University of Cluj, Flora Romaniae Exsiccata, Century X. ; Spain, by Mr. C. V. B. Marquand, and by Miss E. Willmott, Reliquiae Lapeirousianae ; Sweden, by Dr. G. Samuelsson (coll. G. Samuelsson and E. Kohler) ; Switzerland, by Mr. J. W. Wyatt ; U.S.S.R., by the State Sub-tropical Institute, Tiflis ; Yugoslavia, by Mr. B. Gilliat-Smith, and by Mrs. A. P. Thompson ; various, by Mrs. A. Henry (Conifer seeds), and by Dr. G. Samuelsson.

Purchased : Mr. J. Wagner, Tiliae exsiccatae criticae, Fascicle I. ; Mr. Fr. Verdoorn, Hepaticae Selectae et Criticae, Series II, numbers 51-100.

ORIENT.—*Presented* : Cyprus, by Dr. G. C. Druce, Mrs. I. Tracey, and by the Agricultural Department (coll. C. B. Ussher) ; Egypt, by the Horticultural Section, Ministry of Agriculture ; Iraq, by the Rev. F. A. Rogers ; Palestine, by the Department of Agriculture (coll. Miss R. Gabrielith) ; Sinai, by Dr. F. Chodat (coll. A. Kaiser).

ATLANTIC ISLANDS.—*Presented* : Canary Islands, by Mr. A. H. Maude, and by Madame C. C. V. de Perez.

CHINA AND JAPAN.—*Presented* : by the Arnold Arboretum, Harvard University, the Royal Botanic Garden, Edinburgh, and by the Metropolitan Museum of Natural History, Nanking (coll. Y. Tsiang).

Purchased : Prof. W. Y. Chun, Flora of Kwangtung.

INDIA AND CEYLON.—*Presented* : Bengal, by Prof. S. R. Bose (fungi) ; Burma, by Mr. R. N. Parker, and by Mr. C. E. Parkinson ; Ceylon, by the Department of Agriculture ; Lushai Hills, by the Rev. W. J. L. Wenger ; Madras, by the Royal Botanic Gardens, Calcutta, the Agricultural College and Research Institute, Coimbatore, and by the Department of Agriculture ; United Provinces, by Mr. R. N. Parker, and by the University of California, Los Angeles (coll. Umbrao Singh).

MALAY PENINSULA.—*Presented* : by the Forest Research Institute, Kepong, the Agricultural Department, Kuala Lumpur, and by the Botanic Gardens Department, Singapore.

INDO-CHINA.—*Presented* : Siam, by Dr. F. W. Foxworthy, Mr. H. B. Garrett, and by Dr. A. F. G. Kerr (coll. A. F. G. Kerr, Noi Put, and M. C. Lakshnakara).

MALAY ISLANDS.—*Presented* : British North Borneo, by the Forestry Department ; various, by the Director, Botanic Garden, Buitenzorg.

Purchased : Sarawak plants (coll. J. and M. S. Clemens).

NEW GUINEA.—*Presented* : by Mr. G. Bateson, and by the Botanic Museum and Herbarium, Brisbane.

AUSTRALIA.—*Presented* : New South Wales, by the Rev. E. N. McKie, Dr. F. A. Rodway, Miss J. W. Vickery, the Director, Botanic Gardens, Sydney, and by the Department of Agriculture ; Queensland, by Mr. M. A. Cameron, Mr. F. F. Coleman, Mr. G. K. Jackson, Mrs. Estelle Thomson, the Arnold Arboretum, Harvard University (coll. S. F. Kajewski), and by the Botanic Museum and Herbarium, Brisbane ; Northern Australia, by Dr. H. Basedow ; Western Australia, by Mrs. A. Elder, Mr. C. B. Palmer, and by the Director, Botanic Garden, Adelaide (coll. Mr. Pearce) ; South Australia, by Dr. H. Basedow, Mr. J. M. Black, Dr. J. B. Cleland, Mr. E. H. Ising, and by the Director, Botanic Garden, Adelaide ; various by Dr. J. B. Cleland, Dr. A. Meebold, Dr. R. H. Pulleine, Dr. C. S. Sutton, and by the Royal Botanic Garden, Edinburgh (coll. A. Morrison) ; Tasmania, by Dr. F. A. Rodway.

Collected : various localities, by Mr. C. E. Hubbard.

Purchased : Tasmanian plants (the Tasmanian Museum and Art Gallery, Hobart).

NEW ZEALAND.—*Presented* : by Mr. H. W. Lawton.

OCEANIA.—*Presented* : Fiji, by Mr. W. Greenwood, Mrs. C. J. Parham, the University of California, Berkeley (coll. H. E. Parks), and by the Department of Agriculture, Suva ; New Caledonia, by the Royal Botanic Garden, Edinburgh (coll. Franc) ; New Hebrides, by Miss L. E. Cheesman, and by the Royal Botanic Garden, Edinburgh (coll. A. Morrison) ; Solomon Islands, by Miss B. Blackwood ; Tonga, by the University of California, Berkeley (coll. H. E. Parks and W. A. Setchell).

Collected : Bougainville Island, by Mr. J. H. L. Waterhouse.

WEST TROPICAL AFRICA.—*Presented* : Angola, by Mr. J. Gossweiler ; Belgian Congo, by Prof. E. de Wildeman, and by Prof. W. Robyns ; Cameroons, by the Botanic Gardens, Victoria (coll. T. D. Maitland), and by Dr. J. Mildbraed ; Gold Coast, by Dr. F. R. Irvine, and by the Department of Agriculture (coll. J. E. Symond, A. S. Thomas, and T. Lloyd Williams) ; Nigeria, by Dr. C. Christensen (coll. O. Hagerup), Mr. Ivan D. Hepburn, the Forestry Department (coll. H. V. Lely, F. H. Espley and A. S. Thornewill), and by the Department of Agriculture (coll. J. West, E. H. G. Smith and F. D. Golding) ; Sierra Leone, by the Agricultural Department (coll. F. C. Deighton, R. R. Glanville, J. W. D. Fisher, and G. M. Roadan) ; various, by Dr. J. Burtt Davy.

NORTH AND NORTH-EAST AFRICA.—*Presented* : Algeria and Ahaggar Mountains, by Col. R. Meinertzhagen ; Morocco, by Mr. A. W. Trethewy ; Sudan, by the Department of Agriculture and Forests.

EAST AND SOUTH TROPICAL AFRICA.—*Presented* : Kenya, by Dr. R. E. Fries (coll. R. E. and T. C. E. Fries), Sir A. W. Hill, Major E. J. Lugard (coll. E. J. Lugard, Mrs. Cyril Lugard, and T. H. E. Jackson), the Forestry Department, Nairobi (coll. J. McDonald, C. A. Thorold, R. H. Le Pelley, D. C. Edwards, I. R. Dale, and H. M. Gardner), and by the Coryndon Memorial Museum (coll. by Miss E. R. Napier, Mrs. Broadhurst-Hill and Miss C. Harvey) ; Nyasaland, by Dr. J. Burtt Davy, the Royal Botanic Gardens, Edinburgh (coll. G. Adamson), and by the Department of Agriculture ; Portuguese East Africa, by Senhor A. F. de Gomes e Sousa ; Rhodesia, by Dr. J. Burtt Davy, Mr. R. P. Bush, Mr. F. Eyles, Sir A. W. Hill, Mr. D. Stevenson, the Division of Plant Industry, Pretoria (coll. I. B. Pole Evans), and by the Department of Agriculture, Salisbury (coll. J. M. Rattray, T. C. Moore, and J. C. Hopkins) ; S. Sudan, by Mr. N. Douglas Simpson, and by Mr. G. O. Whitehead ; Tanganyika Territory, by the Agricultural Department (coll. F. R. Sanders and A. E. Haarer), the Forestry Department (coll. W. A. Robertson), the Department of Tsetse Research (coll. B. D. Burtt and G. W. St. Clair Thompson), the East African Agricultural Research Station, Amani (coll. P. J. Greenway, H. Musk, and others), and by the Coryndon Memorial Museum (coll. R. L. Harger) ; Uganda, by Sir A. W. Hill, Prof. Dr. H. Humbert, the Agricultural Department, Kampala (coll. J. D. Snowden, L. C. C. Liebenberg, C. G. Hansford, C. W. L. Fishlock and others), and by the Forestry Department, Entebbe (coll. N. V. Brasnett, C. M. Harris, and J. Wright Hill) ; Zanzibar, by Mr. P. J. Greenway, and by Mr. J. H. Vaughan ; various by Dr. J. Burtt Davy.

Collected : Virunga Mountains, by Mr. B. D. Burtt.

MASCARENE ISLANDS.—*Presented* : Mauritius, by Mr. R. E. Vaughan.

CHAGOS ARCHIPELAGO.—*Presented* : by Prof. J. Stanley Gardiner (coll. J. C. Willis and J. S. Gardiner).

SOUTH AFRICA.—*Presented* : Cape Province, by Dr. H. G. Fourcade, Mrs. M. R. Levyns, Mr. F. R. Long, Dr. A. Meebold, and by Dr. J. Muir ; Natal, by the Natal Herbarium ; Transvaal, Mr. G. Thornecroft, and by the Transvaal Museum ; various, by Dr. J. Burtt Davy, Sir A. W. Hill, Mr. T. P. Stokoe, the Rev. F. A. Rogers, Captain T. M. Salter, the Bolus Herbarium, and by the Division of Plant Industry, Pretoria.

Purchased : Mr. E. G. Bryant, Karroo plants.

NORTH AMERICA.—*Presented* : Baffin Land, by the Rev. H. A. Turner ; Greenland, by Miss Louise A. Boyd and by the Rev. F. A. Rogers ; Canada, by Mr. J. C. Bennett ; United States, the Royal Botanic Garden, Edinburgh (coll. Drummond), the Gray Herbarium, Harvard University, the Arnold Arboretum, Harvard University, the University of California, Berkeley (coll. Victor Duran, H. E. Parks, E. B. Copeland and others), the University of California, Los Angeles (coll. Carl Epling and L. Ellison), the California Academy of Sciences, San Francisco (coll. J. T. Howell), and by the U.S. Department of Agriculture (coll. G. C. Hedgcock).

Purchased : Mr. J. W. Thompson, Washington plants.

CENTRAL AMERICA.—*Presented* : various, by the Field Museum, Chicago.

Purchased : Mr. W. A. Schipp, British Honduras plants.

WEST INDIES.—*Presented* : Cuba, by the Arnold Arboretum, Harvard University, and by Riksmuseum, Stockholm (coll. E. L. Ekman) ; Jamaica, by the University of California, Berkeley (coll. E. R. Orcutt) and by Mr. Barclay Brown (coll. Mrs. Budd) ; Trinidad and Tobago, by the Department of Agriculture (coll. R. O. Williams and R. C. Marshall) ; various, by Miss E. M. Wakefield (ferns).

Purchased : Mr. W. E. Broadway, Trinidad plants ; Mr. E. J. Valeur, Dominican Republic plants ; Mr. R. Ciferri, Mycoflora Domingensis Exsiccata ; the Smithsonian Institution, Haiti plants.

EAST TROPICAL SOUTH AMERICA.—*Presented* : Brazil, by the U.S. Department of Agriculture (coll. Mrs. Chase), the Director, Botanic Garden, Rio de Janeiro (coll. A. Ducke), and by the Gray Herbarium, Harvard University (coll. L. B. Smith) ; British Guiana, by the Forestry Department (coll. J. B. Aitken and others), the Department of Agriculture (coll. E. B. Martyn, A. A. Abraham, and T. Bone), and by the Field Museum, Chicago (coll. A. C. Persaud).

WEST TROPICAL SOUTH AMERICA.—*Presented* : Peru, by the Field Museum, Chicago ; various, by the U.S. National Museum (coll. E. P. Killip and A. C. Smith).

TEMPERATE SOUTH AMERICA.—*Presented* : Argentine, by Prof. L. R. Parodi and Dr. Angel L. Cabrera ; Chile, by Mrs. D. Carson Roberts and by Mr. A. H. Hunter.

DISTRIBUTION OF DUPLICATES.

The following were the principal institutions to which duplicates were distributed :—

Great Britain and Irish Free State.—Aberdeen, Cruickshank Botanic Garden ; Dublin, Trinity College ; Edinburgh, Royal Botanic Garden ; London, Natural History Museum ; Oxford, Imperial Forestry Institute.

Europe and Orient.—Berlin, Botanic Gardens and Museum ; Brussels, Botanic Garden ; Copenhagen, University Botanic Museum ; Jerusalem, The Hebrew University ; Karlovy, The University ; Paris, Natural History Museum ; Riga, Botanical Institute ; Stockholm, Botanical Museum ; Tervueren, Belgian Congo Museum ; Utrecht, University Botanic Museum and Herbarium.

Africa.—Amani, East African Agricultural Research Station ; Grahamstown, Albany Museum ; Nairobi, Coryndon Memorial Museum ; Pretoria, Division of Plant Industry ; Salisbury, Department of Agriculture, Southern Rhodesia.

Asia.—Buitenzorg, Botanic Gardens ; Hong Kong, Botanical and Forestry Department ; Canton, Sun Yat-Sen University ; Nanking, National South Eastern University.

America.—Cambridge, Mass., Botanical Museum ; New York, Botanical Garden ; Washington, D.C., U.S. Department of Agriculture ; U.S. National Museum ; Rio de Janeiro, Botanic Garden ; Georgetown, Demerara, Forestry Department.

The Library.

The more important presentations received during the year are as follows :—

The Bentham Trustees have presented a copy of the late Sir Frank Crisp's *Mediaeval Gardens*, which was edited after his death by his daughter, Mrs. Catherine Childs Paterson, and published in two volumes in 1924. Other books presented by the Trustees are :—S. Dale, *Pharmacologia*, ed. 3, London, 1737 ; P. Dioscorides, *De medicinali materia libri quinque . . . Joanne Ruellio interprete*, Paris, 1516 ; J. J. Fillassier, *Dictionnaire du jardinier françois*, Paris, 1791, 2 vols. ; A. Haller, *De Allii genere naturali libellus*, Gottingae, [1745] ; C. von Linné, *Philosophia botanica, editio secunda . . . curante J. G. Gleditsch*, Berolini, 1780 ; H. W. Wollenweber, *Fusaria autographice delineata, tabulae 660-1100*, Berolini, 1930, and *Fusarium-Monographie*, in *Zeitschr. f. Parasitenkunde*, Bd. 3, Heft 3, Berolini, 1931 ; and Miss S. A. Young's *Studies of trees, with and without foliage*, 12 plates, Edinburgh, 1834 ; also the continuation of several periodicals received in exchange for *Hooker's Icones Plantarum*.

The *Index Londinensis*, the new edition of G. A. Pritzel's *Iconum botanicarum index*, which has been prepared under the auspices of the Royal Horticultural Society by Dr. Otto Stapf at the Royal Botanic

Gardens, Kew, and published by the Clarendon Press, Oxford, is now completed. The final two volumes, 5 and 6, issued during the year, have been presented by the Royal Horticultural Society, and a second copy by Miss R. Chichester of Arlington Court, near Barnstaple. The work includes references to figures of plants published up to the end of 1920. A supplement to cover the years 1921 to 1935 is now in progress.

Lieut.-Col. Sir David Prain has presented the continuation of several periodicals, including the *Bulletin de la Société Botanique de France*, *Berichte der Deutschen Botanischen Gesellschaft*, *The Quarterly Journal of Pharmacy*, and *Proceedings of the American Philosophical Society*. He has also presented about a hundred botanical papers and a number of volumes among which are A. Engler's *Monographie der Gattung Saxifraga L.*, 1872, and A. H. Church's *Types of floral mechanism*, part 1, 1908.

The following books have been received from their publishers for review in the Kew Bulletin:—J. Adams, *A student's illustrated Irish flora* (from Messrs. L. Reeve & Co.); J. Britten & G. S. Boulger, *A biographical index of deceased British and Irish botanists*, ed. 2, revised and completed by A. B. Rendle (from Messrs. Taylor & Francis); L. J. Cook, *Perpetual carnations* (from Messrs. Benn); W. Dallimore & A. Bruce Jackson, *A handbook of Coniferae including Ginkgoaceae*, ed. 2 (from Messrs. E. Arnold & Co.); R. Fisher, *Flowers of grass: how to know the names of British grasses* (from Messrs. Wheldon & Wesley); and A. C. Seward, *Plant life through the ages* (from the Cambridge University Press). All were issued in 1931.

Books received from the Editor of *Nature*. The more important are:—E. B. Copeland, *The coconut*, ed. 3; A. Engler & K. Prantl, *Die natürlichen Pflanzenfamilien*, zweite Auflage, Bd. 19a and 19c (bound); A. J. Ewart, *Flora of Victoria*, 1930; O. Gessner, *Die Gift- und Arzneipflanzen von Mitteleuropa*; R. Grimwade, *An anthology of the Eucalypts*, ed. 2, 1930; A. M. Johnson, *Taxonomy of the flowering plants*; J. C. Liu, *Systematic botany of the flowering families in North China*; and E. Thurston, *British and foreign trees and shrubs in Cornwall*, 1930. Those of which the year is not stated were published in 1931.

Independent works and a few of the more important reprints from periodicals received include the following, which have been presented by their authors, unless otherwise stated:—*Anvers, Ve Congrès International d'Agriculture Tropicale*, 1930, *Rapports*, etc. (from the Secrétariat Général, Brussels); A. Barbey, *À travers les forêts de Pinsapo d'Andalousie*; H. M. L. Bolus, *Notes on Mesembrianthemum and allied genera*, pt. 2, pp. 225-308, 3 copies; H. Brenier, *Essai d'atlas statistique de l'Indochine*, 1914 (from Mr. H. C. Sampson); P. Brühl, *A census of Indian mosses*, in *Rec. Bot. Surv. India*, vol. xiii, no. 2; Cambridge, *Fifth International Botanical Congress, Report of Proceedings* (from the Executive Committee);

H. G. Champion & I. D. Mahendru, *Sylvicultural research manual for use in India*, vol. ii (from the Government of India) ; *Classified list of daffodil names* (from the Royal Horticultural Society) ; W. G. Craib, *Florae Siamensis enumeratio*, vol. i, pt. 4 (from the Siam Society, Bangkok) ; G. Delevoy, *La question forestière au Katanga*, 3 vols., 1928-29 (from the Comité Spécial du Katanga) ; É. De Wildeman, *Plantae Bequaertianae*, vol. v, fasc. 2 & 3 ; *Flora Sibirica* *et Dal'nego Vostoka* (*Flora Sibiriae et Orientis extremi a Museo Botanico Academiae Scientiarum edita*), pts. 5 & 6, Leningrad, 1930-31 ; R. Florin, *Untersuchungen zur Stammesgeschichte der Coniferales und Cordaitales*, Teil 1, in *K. Svenska Vet.-Akad. Handl.*, ser. 3, vol. x, no. 1 ; J. Fothergill, *The gardener's colour book*, 1927 ; H. Fröderström, *The genus Sedum L.*, pt. 2, in *Acta Horti Gothoburgensis*, vol. vi, app. ; J. S. Gamble, *Flora of the Presidency of Madras*, pt. ix, *Commelinaceae to Cyperaceae*, by C. E. C. Fischer (from the Secretary of State for India) ; C. A. Gardner, *Enumeratio plantarum Australiae occidentalis*, 1930-31 (from Director, Department of Agriculture, Western Australia) ; H. Gilbert-Carter, *Our catkin-bearing plants*, 1930 ; *The Handbook of Tanganyika*, 1930 (from the Government of Tanganyika Territory) ; W. F. van Hell, *Onderzoekingen over ziekten van lelies*, Proefschrift ; G. Herter, *Florula Uruguayensis*, 1930 ; H. H. Hu & R. C. Ching, *Icones filicum Sinicarum*, fasc. 1, 1930 ; E. Hultén, *Flora of Kamtschatka and the adjacent islands*, iv, in *K. Svenska Vet.-Akad. Handl.*, ser. 3, vol. viii, no. 2, 1930 ; J. B. Hurry, *The woad plant and its dye*, 1930 (from Mrs. Hurry) ; J. Hutchinson & J. M. Dalziel, *Flora of West Tropical Africa*, vol. ii, pt. 1, 5 copies (from the Crown Agents for the Colonies) ; H. A. Hyde, *Welsh timber trees native and introduced*, 2 copies (from author and National Museum of Wales) ; H. H. Janssonius, *Mikrographie des Holzes der auf Java vorkommenden Baumarten*, Liefg. 10, 1930 ; M. Jarry, *Manuel d'agriculture tropicale*, 1917 (from Mr. Alfred J. Large) ; R. Keller, *Synopsis rosarum spontaneorum Europae mediae*, in *Denkschr. Schweiz. Naturforsch. Ges.*, Bd. lxxv (from Prof. Hans Schinz) ; G. Koidzumi, *Florae symbolae Orientali-Asiaticae*, 1930 ; V. L. Komarov, *Flora peninsulae Kamtschatka*, iii, 1930 (from the Academy of Sciences, Leningrad) ; W. M. Kruseman, *De invloed van temperatuur en narcose op het transport der assimilaten*, Proefschrift ; J. Lanjouw, *The Euphorbiaceae of Surinam*, Proefschrift ; L. Lefébure, *Atlas botanique, ou clef du jardin de l'univers*, etc., 1817 (from Mr. J. S. L. Gilmour) ; A. Lemée, *Dictionnaire descriptif et synonymique des genres de plantes phanérogames*, tome iii ; J. H. Maiden, *A critical revision of the genus Eucalyptus*, pt. 75 (from Director, Botanic Gardens, Sydney) ; Mildred E. Mathias, *Studies in the Umbelliferae*, iii, in *Ann. Missouri Bot. Gard.* vol. xvii, 1930 ; K. Miyabe & Y. Kudo, *Icones of the essential forest trees of Hokkaido*, fasc. 20-28, 1928-31, with plates 59-86, drawn by C. Suzuki (from the Hokkaido Government) ; T. Nakai, *Flora sylvatica Koreana*, pars xviii, 1930 (from the Forest Experiment Station, Government General of Chosen) ; E.

Nelmes & W. Cuthbertson, *Curtis's Botanical Magazine dedications, 1827-1927: portraits and biographical notes* (from the Royal Horticultural Society; there is a reference to this work in the note on Illustrations and Photographs); L. Newton, *A Handbook of the British Seaweeds* (from the Trustees of the British Museum); *North American Flora*, vol. xvii, pt. 4, and vol. xviii, pt. 1 (from Director-in-Chief, New York Botanical Garden); Emily H. Pelloe, *West Australian Orchids*, 1930 (from Sir Francis Newdegate); J. F. V. Phillips, *Forest-succession and ecology in the Knysna Region, forming Memoir of the Botanical Survey of South Africa*, no. 14 (from Dr. I. B. Pole Evans); *Proceedings of the celebration of the three hundredth anniversary of the first recognised use of Cinchona held at the Missouri Botanical Garden, St. Louis, October 31-November 1, 1930*; *Reports of the Great Barrier Reef Committee*, vols. i-iii, 1925-31 (from the Committee); S. Sasaki, *A catalogue of the Government Herbarium* (Government Research Institute, Taihoku, Formosa), issued as Report no. 9 of the Department of Forestry; K. Sawada, *List of fungi found in Formosa*; H. Seckt, *Flora Cordobensis*, in *Rev. Univ. Nac. Córdoba*, vols. xvi-xvii, 1929-30 (from Mr. S. Gaselee); N. M. Stelling-Dekker, *Die Sporogenen Hefen*, in *Verhandel. K. Akad. Amsterdam*, vol. xxviii, no. 1 (from Prof. Joanna Westerdijk); F. L. Stevens, *Fungi from Costa Rica and Panama*, in *Illinois Biol. Monogr.*, vol. xi, no. 2, 1927; R. P. Strong (Editor), *The African Republic of Liberia and the Belgian Congo, based on the observations made and material collected during the Harvard African Expedition, 1926-27*, 2 vols., 1930 (from the Editor); J. McLean Thompson, *Studies in advancing sterility*, pt. v, in *Publications of the Hartley Botanical Laboratories* (University of Liverpool), no. 7; H. Trimen, *A handbook to the flora of Ceylon*, pt. vi, Supplement, by A. H. G. Alston, 2 copies (from the Crown Agents for the Colonies); A. Wood, *A class-book of botany*, ed. 1, 1845, and the 1849 reprint of ed. 2 = "tenth edition" (from the Gray Herbarium of Harvard University); and E. W. Wulff, *Flora Kruima (Flora Taurica)*, vol. i, fasc. 3, 1930. Those of which the year of publication is not stated were issued in 1931.

Periodical and serial publications, which have been presented by their editors or the societies or institutions issuing them, unless otherwise stated, include the following:—*Acta Botanicae Instituti Botanici Universitatis Zagrebensis*, vol. v; *Acta Florae Sueciae*, Bd. i, 1921, all issued (from Dr. R. E. Fries); *Acta Horti Botanici Universitatis Latviensis*, vol. v, nos. 1-3, and vol. vi, no. 1; *Acta Horti Gothoburgensis*, vol. vi; *Addisonia*, vol. xvi, nos. 1-3 (from Director-in-Chief, New York Botanical Garden); *Anales del Museo Nacional de Historia Natural "Bernardino Rivadavia,"* (Buenos Aires), vol. xxxvi; *Annalen Societatis Zoolog.-Botanicae Fennicae Vanamo*, vols. xi, xiii and xv; *Archief voor de Thee-cultuur in Nederlandsch-Indië*, 1930, nos. 4-6 and 1931, nos. 1-4; *Archives du Muséum National d'Histoire Naturelle* (Paris), 6^{me} série, vol. v; *Australian and New Zealand Association for the Advancement of Science, Report of the 20th meeting*,

1930 ; *British Association for the Advancement of Science, Report of the 98th meeting*, 1930 (from Miss E. M. Wakefield) ; *The British Fern Gazette*, vol. vi, nos. 2-3 (from Mr. C. H. Wright) ; *Brittonia*, a series of botanical papers, published by the New York Botanical Garden, vol. i, nos. 1-2 ; *Bulletin de l'Institut et du Jardin Botaniques de l'Université de Beograd*, vol. i, no. 3 ; *Bulletin du Jardin Botanique de Kieff*, livr. 11 ; *Bulletin of the Madras Government Museum*, new series, vol. iv, pt. 1 (from Mr. C. E. C. Fischer) ; *Bulletin of the Miyazaki College of Agriculture and Forestry*, no. 3 ; *Bulletin of the Rubber Growers' Association*, vol. xiii ; *Bulletin de la Société Botanique de Bulgarie*, vol. iv. ; *Bulletin de la Société Botanique de Genève*, 2^{me} série, vol. xxii ; *Bulletin de la Société Dendrologique de France*, nos. 76-78 (from Mr. W. J. Bean) ; *Bulletin de la Société Royale de Botanique de Belgique*, vol. lxiii, fasc. 2 ; *Contributions from the Biological Laboratory of the Science Society of China, Nanking*, 15 numbers ; *Contributions du Laboratoire de Botanique de l'Université de Montréal*, nos. 16-18 ; *The Empire Cotton Growing Review*, vol. viii ; *Erdészeti Kísérletek (Forest Researches)*, Sopron, Hungary, vol. xxxii, pts. 2-4, and vol. xxxiii, pts. 1-2 ; *Forestry: the Journal of the Society of Foresters of Great Britain*, vol. iv, no. 2, and vol. v, nos. 1-2 ; *Hardy and Half-hardy Plants*, edited and published by A. W. Darnell, vol. i, and vol. ii, nos. 1-4 and 6 ; *Indian Forester*, vol. lvii ; *Indian Tea Association, Quarterly Journal*, 1930, pt. 4, and 1931, pts. 1-3 ; *Japanese Journal of Botany*, published by the National Research Council of Japan, vol. v, nos. 3-4 ; *Journal of the Board of Greenkeeping Research*, vol. ii, nos. 4-5 ; *Journal of the Department of Agriculture, Kyushu Imperial University (Fukuoka, Japan)*, vol. iii, nos. 2-5 ; *Journal of the Department of Agriculture of Victoria*, vol. xxx ; *Journal of the Faculty of Science, Imperial University of Tokyo*, sect. 3, Botany, vol. iii, pts. 1-2 ; *Journal of the Federated Malay States Museums*, vols. xvi, pts. 1-4 ; *Journal of the Imperial Agricultural Experiment Station, Nishigahara (Tokyo)*, vol. i, nos. 1-2 ; *Journal of the New Zealand Institute of Horticulture*, vol. ii, nos. 3-4, and vol. iii, no. 1 ; *Journal of Science of the Hiroshima University (Japan)*, series B, div. 2 (Botany), vol. i, articles 1-3 ; *K. Svenska Vetenskapsakademiens Handlingar*, ser. 3, vol. viii, no. 2, vol. ix, nos. 1-6, and vol. x, no. 1 ; *Long Ashton Agricultural and Horticultural Research Station, Annual Report*, 1930 ; *Malayan Forest Records*, no. 9 ; *Memoirs of the American Academy of Arts and Sciences*, vol. xvi, pt. 1 (Contribution towards a monograph of the Laboulbeniaceae, by R. Thaxter, v) ; *Memoirs of the College of Agriculture, Kyoto Imperial University*, nos. 13-14 ; *Memorias do Instituto Oswaldo Cruz (Rio de Janeiro)*, vol. xxiv, fasc. 3-4, and vol. xxv, fasc. 1-4 ; *Memorias da Sociedade Broteriana (Coimbra)*, vol. i (Subsidios para o conhecimento da flora da Guiné portuguesa, por A. de Figueiredo Gomes e Sousa) ; *Mežsaimniecības rakstu krajums (Sammlung forstwirtschaftlicher Schriften, herausgegeben vom Verbands lettlandischer Forstwirte)*, vol. viii ; *Mykologia (Orgán*

Českosloveskéno Klubu Mykologickéno v Praze), vols. v-vi; *Natural History Magazine*, published by the British Museum (Natural History), vol iii, nos. 17-20; *Nederlandsche Dendrologische Vereeniging*, *Jaarboek*, 1930; *Nederlandsch Kruidkundig Archief*, 1930, Afl. 3, and 1931, Afl. 1; *Nigeria, Geological Survey, Bulletin*, no. 13 (from the Government of Nigeria); *Notes from the Royal Botanic Garden, Edinburgh*, nos. 78 and 79; *Nova Acta Regiae Societatis Scientiarum Upsaliensis*, ser. 4, vol. vi, fasc. 2, and vol. vii, fasc. 1; *The Orchid Review*, vol. xxxix; *Preslia* (Prague), vol. ix; *Proceedings of the Imperial Academy* (Japan), vol. vi, nos. 9-10, and vol. vii, nos. 1-8; *Proceedings of the Royal Irish Academy*, sect. B, vol. xxxix, nos. 26-28, and vol. xl, nos. 1-10; *Quarterly Journal of Forestry*, vol. xxv; *Queensland Agricultural Journal*, vols. xxxiv, pt. 5 to vol. xxxvi, pt. 4; *Records of the Botanical Survey of India*, vol. xiii, no. 2, 3 copies; *Recueil des Travaux Botaniques Néerlandais*, vol. xxvii, and vol. xxviii, livr. 1-2; *Research Studies of the State College of Washington*, vol. ii, nos. 3-4; *The Science Reports of the Tohoku Imperial University* (Sendai, Japan), ser. 2 (Geology), vol. xii, no 2A, vol. xiv, no. 2A, and vol. xv, no. 1; ser. 4 (Biology), vol. v, no. 4, and vol. vi, nos. 1-3; *Scripta Horti Botanici Universitatis Vytauti Magni* (Kaunas, Lithuania), vol. i; *Sinensia* (Contributions from the Metropolitan Museum, Nanking), vol. i, nos. 8-12, vol. ii, no. 1, and Special Bulletin, no. 1; *Taihoku Botanic Garden* (Formosa), *Annual Reports*, vol. i; *The Tasmanian Journal of Agriculture*, vol. ii, nos. 1-4; *Transactions and Proceedings of the Botanical Society of Edinburgh*, vol. xxx, pt. 4; *Transactions and Proceedings of the New Zealand Institute*, vol. lxi, pts. 3-4, and vol. lxii, pts. 1-2; *Transactions of the Royal Society of Canada*, ser. 3, sect. 5, vol. xxiv, pt. 1, and vol. xxv; *Transactions of the Tottori Society of Agricultural Science* (Japan), vol. ii, no. 2, and vol. iii; *Travaux des Laboratoires de Matière Médicale et de Pharmacie Galénique de la Faculté de Pharmacie de Paris*, vol. xxi; *Tropical Woods* (Yale University School of Forestry), nos. 25-28; *Union of South Africa, Veterinary Services and Animal Industry*, 17th Report of the Director, pts. 1 and 2; *The University of Colorado Studies*, vol. xviii, nos. 2-3, *Watson Botanical Exchange Club*, 47th Annual Report (from Mr. H. Stuart Thompson); *Yale University School of Forestry, Bulletin*, nos. 26-31.

Numerous other publications have been received from the Empire Marketing Board, the Imperial Agricultural Bureaux, especially the Imperial Bureau of Soil Science, Rothamsted Experimental Station, the Imperial Bureaux of Plant Genetics at Cambridge and Aberystwyth, and the Imperial Bureau of Fruit Production, East Malling Research Station, the Botanical Laboratory of the University of Utrecht, the Botanical Museum of the University of Zurich, the Departments of Agriculture and Forestry in India, the Indian Lac Association for Research, including *A practical manual of lac cultivation*, by P. M. Glover, the Botanical Section of the Ministry of

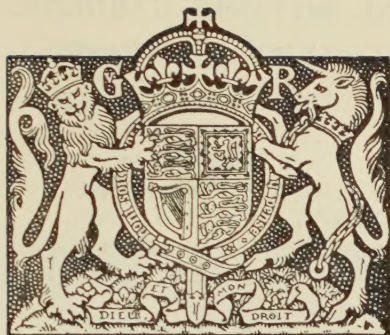
Commerce and Communications, Siam, the Department of Agriculture, Industry and Commerce in the Dutch East Indies, the Botanic Garden, Buitenzorg, the Bureaux of Science, Plant Industry and Forestry, Philippine Islands, the New York Botanical Garden, the Missouri Botanical Garden, St. Louis; the United States Department of Agriculture; and the Cornell University Agricultural Experiment Station.

A large number of papers, usually reprints from periodicals, have been received. Contributors of these include Dr. Agnes Arber, Dr. Kathleen B. Blackburn, Mrs. Frank Bolus, Prof. J. Bornmüller, Prof. K. Braun, Mr. B. F. Bush, Miss A. Camus, Prof. H. Chermezon, Prof. R. Chodat, Dr. P. Chouard, Dr. B. H. Danser, Prof. E. De Wildeman, Prof. L. Diels, Mr. H. N. Dixon, Dr. A. Ducke, Dr. G. Einar Du Rietz, Sir A. W. Hill, Prof. A. S. Hitchcock, Prof. R. Maire, Dr. F. P. Metcalf, Rev. Luis Mille, Prof. S. Murbeck, Dr. E. P. Phillips, Prof. K. Rouppert, Prof. G. Samuelsson, Dr. T. A. Sprague, Mr. H. Sydow, Mr. I. Thériot, and Prof. N. I. Vavilov.

Among the maps added to the collection are two of the Arctic Ocean and Greenland Sea showing route of the Louise A. Boyd Expedition, 1931, presented by Miss Boyd. A map of Rhodesia, in four sheets, compiled by R. T. Hockey, has been received from Mr. E. W. B. H. Milne-Redhead, and a map of Florida, prepared for the United States Department of Agriculture, from Mr. H. C. Sampson.

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ROYAL BOTANIC GARDENS, KEW

BULLETIN OF MISCELLANEOUS INFORMATION

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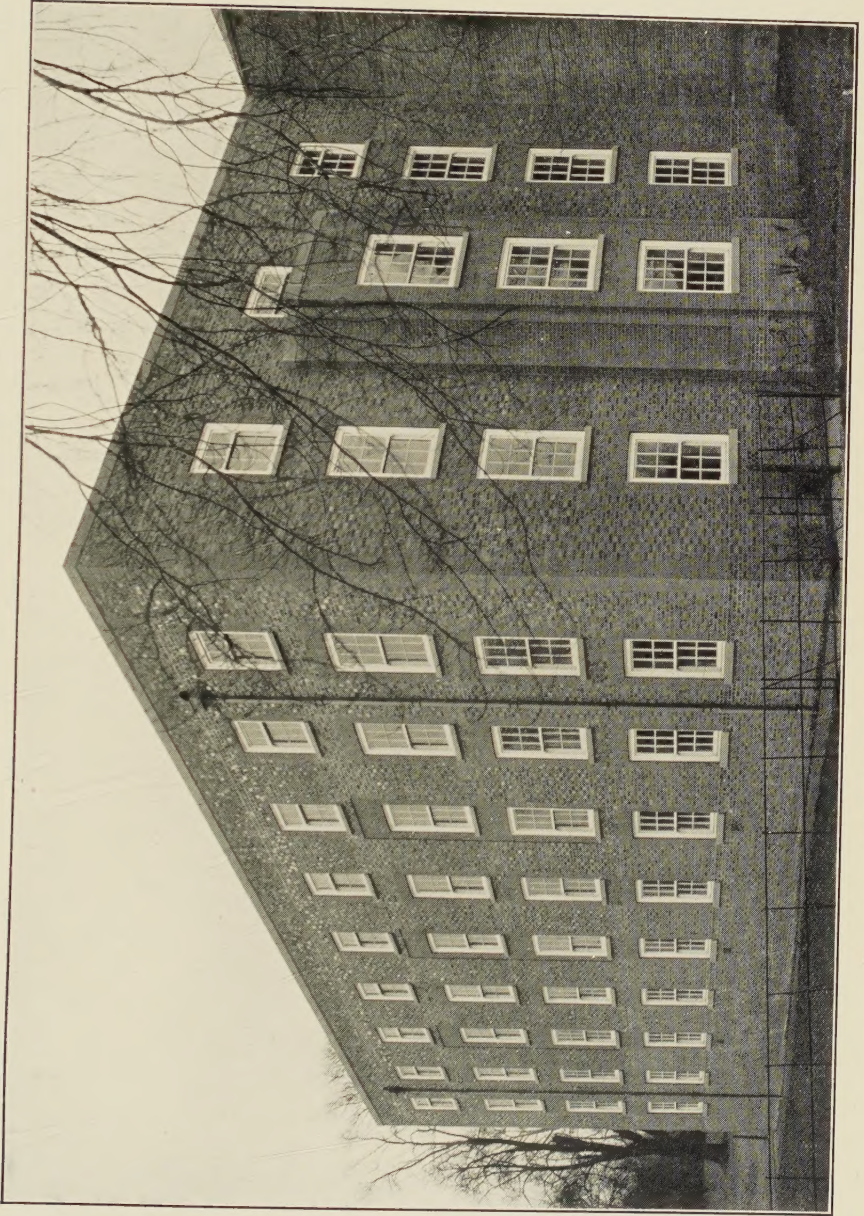
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PLATE XI



The new wing of the Herbarium viewed from the south-west.

PLATE XII



The interior of the new wing of the Herbarium.

To face page 3].